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MEDICAL HANDBOOK

FOR THE USE OF

LIGHTHOUSE VESSELS AND STATIONS

1912

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DEPARTMENT OF COMMERCE AND LABOR

U. S. BUREAU OF LIGHTHOUSES

MEDICAL HANDBOOK

FOR THE USE OF

LIGHTHOUSE VESSELS AND STATIONS

Revised by

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WASHINGTON

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MEDICAL HANDBOOK FOR THE USE OF LIGHTHOUSE VESSELS AND STATIONS.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF LIGHTHOUSES,
Washington, D. C., February 1, 1912.

This Handbook has been prepared for the benefit of officers and employees of the Lighthouse Service, whose duty on vessels and at remote stations may render it difficult at times for them to obtain necessary medical assistance or advice. In all cases of serious sickness or injury, however, medical attendance should be obtained as soon as practicable. Written directions must very imperfectly supply the place of the physician and surgeon. With a medicine chest and handbook it is not possible to provide for and explain the treatment of more than a few of the commoner diseases by persons who have not had a medical education.

Medicine chests, equipped with the list of articles given herein, will be supplied to the vessels and remote stations, as approved. Such chests must be kept accessible, frequently inspected, and fully equipped. The dates when obtained must appear on all medicines and packages, and they must be renewed when no longer serviceable, according to the length of time stated in the list of medicines and articles.

Sick or disabled persons employed on vessels of the Lighthouse Service will be admitted to the benefits of any United States marine hospital without charge at any time upon application of their respective commanding officers.

This Handbook is a revision for the use of the Lighthouse Service of the Handbook for the Ship's Medicine Chest, prepared by George W. Stoner, surgeon, United States Public Health and Marine-Hospital Service, by direction of the Surgeon General of that Service.

G. R. PUTNAM,
Commissioner of Lighthouses.

MEDICINES AND ARTICLES TO BE SUPPLIED FOR MEDICINE CHESTS.

For lighthouse vessels.	For light stations.	Item.
1 pound	1 pound	Absorbent cotton.
8 ounces	4 ounces	Aromatic spirits of ammonia (1 year).
1 yard	1 yard	Belladonna plaster (1 year).
4 ounces	4 ounces	Bicarbonate of soda.
100	100	(**Poison**) Bichloride of mercury, antiseptic tablets of 7.3 grains each. One tablet to pint of water makes solution 1 part bichloride to 1,000 of water.
100	100	Bismuth subnitrate, 5-grain tablets.
1 pound	½ pound	Boric acid, powdered.
200	100	Brown mixture, lozenges.
200	100	(**Poison**) Calomel, $\frac{1}{10}$-grain tablets.
100	100	(**Poison**) Camphor and opium pills.
16 ounces	8 ounces	(**Poison**) Carbolic acid.
16 ounces	8 ounces	Castor oil.
100	100	Copaiba, 5-minim capsules.
1	1	Court-plaster, envelope
1 ounce	½ ounce	Creosote.
2 pounds	1 pound	Epsom salts.
12 rolls	6 rolls	Gauze, 2-inch bandage.
10 yards	5 yards	Gauze, plain, aseptic.
16 ounces	8 ounces	Glycerin.
8 ounces	4 ounces	(**Poison**) Laudanum (1 year).
2 pounds	1 pound	Mustard.
12	12	Mustard plasters, in boxes.
16 ounces	16 ounces	Olive oil.
8 ounces	4 ounces	(**Poison**) Paregoric (1 year).
32 ounces	16 ounces	Petrolatum.
100	100	Potassium bromide, 5-grain tablets.
100	100	Potassium chlorate, 5-grain tablets.
100	100	Potassium iodide, 5-grain tablets.
100	100	Quinine, 5-grain tablets.
2	1	Rubber adhesive plaster, 10-yard wheel, 1 inch wide (1 year).
1	1	Rubber catheter No. 10, English (1 year).
200	100	Salicylate of soda, 5-grain tablets.
32 ounces	16 ounces	Soap liniment.
1	1	Spool of silk ligature, medium size.
100	100	Strychnia sulphate, $\frac{1}{60}$-grain tablets.
200	200	(**Poison**) Sun cholera mixture, 15-minim tablets.
2	2	Surgical needles, in glass-stoppered bottles.
1	1	Thermometer, clinical, self-registering, Fahrenheit.
8 ounces	4 ounces	(**Poison**) Tincture of iodine.
8 ounces	4 ounces	Tincture of myrrh.

These medicines will remain serviceable until used if kept in glass-stoppered bottles, with the exception of those marked "1 year," which should be renewed after that interval.

For bulky articles not over a pint of each need be kept in the medicine chest.

All poisonous medicines must be plainly so marked on the bottles or packages.

SANITATION.

On vessels.—The master of a vessel should observe the following measures on board his vessel, and the same rules should be applied at light stations, so far as useful.

The water-closets, forecastle, bilges, and similar portions of the vessel liable to harbor infection should be frequently cleansed.

Free ventilation and rigorous cleanliness should be maintained in all portions of the ship during the voyage and measures taken to destroy rats, mice, fleas, flies, roaches, mosquitoes, and other vermin.

A patient sick of a communicable disease should be isolated and one member of the crew detailed for his care and comfort, who, if practicable, should be immune to the disease.

Communication between the patient or his nurse and other persons on board should be reduced to a minimum.

Used clothing, body linen, and bedding of the patient and nurse should at once be immersed in boiling water or in a disinfecting solution of 1 to 1,000 bichloride of mercury, and should be kept so immersed for 20 minutes.

The compartment from which the patient was removed should be disinfected and thoroughly cleansed.

Any person suffering from malarial fever should be kept under mosquito bars and the apartment in which he is confined closely screened with mosquito netting. All mosquitoes on board should be destroyed by burning Pyrethrum powder (Persian insect powder) or by fumigation with sulphur, burning 4 pounds sulphur to 1,000 cubic feet air space, the room or compartment to be closed for 4 hours. Mosquito larvæ (wigglers or wiggle tails) should be destroyed in water barrels, casks, and other collections of water about the vessel by the use of petroleum (kerosene). Where this is not practicable, use mosquito netting to prevent the exit of mosquitoes from such breeding places.

Formulas for disinfecting solutions recommended for use.

Bichloride of mercury (1:1,000):	
Bichloride of mercury	1
Sea water	1,000
Carbolic acid (2.5 per cent):	
Carbolic acid, pure	25
Fresh water	1,000

Flies as carriers of disease.—It is a well-known fact that flies carry the germs of such well-known diseases as tuberculosis, typhoid fever, and probably smallpox; hence the importance of preventing their breeding near a dwelling or securing access to a house. They breed in such things as stable manure, garbage, etc., in from eight to ten days after the eggs are deposited. The fly deposits its eggs, which

in a few days hatch into a white worm, popularly called the maggot, then turning into the fly. If there is a stable near the lighthouse, the manure in it should be protected from the access of flies by a screening or some similar method. All garbage not buried or burned should be in cans, protected by tops, so that the flies can not get in. All openings to the house should be protected by wire netting, preferably bronze wire, 16 mesh to the inch.

Mosquitoes.—Mosquitoes are known to convey such diseases as malarial and yellow fever by biting a person sick with this disease and afterwards inoculating other persons by biting them. The screens mentioned above, properly applied to all the openings of the house, will prevent their entrance into it. They breed usually in stagnant water. The eggs are deposited on the surface of the water and are hatched out first in the form of what is known as wiggle tails or wigglers. At the end of about ten days these wigglers go through certain changes and become full-fledged mosquitoes. It is important that no water be allowed to stand in containers about the dwelling for a period as long as eight days. If there are such containers, they should be emptied every five or six days or protected by a netting, so that the mosquitoes can not obtain access to lay their eggs. Ponds are the principal breeding ground of mosquitoes, and if possible they should be drained or oiled when near a dwelling. The malarial mosquito only bites about sundown or during the night.

Diet.—In all acute diseases, especially those attended with fever, the question of diet is a very important one, and the main reliance may be placed on such food as eggs and milk. Thin soups may be used, but they contain very little nutrition and can not be depended upon to maintain the strength of the sick.

The proper mastication or chewing of the food is necessary to good digestion and the maintenance of a healthful condition. On this account the drinking of large quantities of fluid at mealtime is objectionable, as it has a tendency to wash down the solids before they are properly chewed. It is desirable to have the meals at regular hours.

Cleanliness of the person.—A cold bath every morning is probably the best plan for a person in vigorous health, but to take one with benefit there should be a pleasant glow of exhilaration afterwards, and it is necessary in cold weather for the average person to have a warm room in which to take this cold bath. A great many people do better with a bath in tepid water; but it is impossible to fix any hard and fast rule in these matters.

The presence of bedbugs in dwellings is indicative of want of care and cleanliness as to bed, bedclothes, etc., and means should be taken to exterminate them when they appear. A liberal application

of kerosene oil to the places infested is probably the best means of killing them.

Care of the mouth and teeth.—The teeth should be cleansed after each meal with a soft brush, using some mild dentifrice. Castile soap makes an excellent cleanser in the absence of a dentifrice.

For toothache caused by a decaying tooth often the only cure is pulling out the tooth. Relief, however, can sometimes be obtained by cleaning out the cavity and putting in two or three drops of creosote on a small piece of cotton. For toothache without the presence of a decayed tooth to cause it, the application of heat to the seat of the pain will often give relief.

COMMON POISONS AND THEIR ANTIDOTES.

Bichloride of mercury or corrosive sublimate.—Give the whites of several eggs mixed with milk or water, or flour and water, if eggs can not be obtained. Then administer an emetic of a tablespoonful of mustard in warm water. The importance of giving these remedies as soon as possible after taking of the poison should be understood.

Opium including morphine, laudanum, and paregoric.—An emetic—a tablespoonful of mustard in warm water—should be immediately administered, and if the patient becomes very drowsy cold water may be dashed in his face and he may be beaten with a wet towel and forced to walk up and down. When the respiration becomes slow and irregular, artificial respiration should be made, the same as is used to restore the partially drowned.

Carbolic acid.—Give grain alcohol (not wood alcohol) liberally, as much as a half glass, followed immediately by an emetic. If the alcohol is not obtainable, a half ounce of Epsom salts in warm water may be administered; then give the emetic consisting of a tablespoonful of mustard in warm water. Common table salt, two tablespoonfuls in a glass of warm water, is an excellent emetic if nothing else can be secured.

Arsenic, including Paris green.—Administer immediately a tablespoonful of mustard in a glass of warm water, and repeat if vomiting is not very free, as it is all important to empty the stomach at once. Afterwards give milk and eggs freely, or olive oil, one-fourth pint. A tablespoonful of common washing soda in a half glass of water will often relieve the symptoms.

USE OF CLINICAL THERMOMETER.

Place bulb of mercury in mouth under tongue for five minutes. If it registers over 101 degrees, send for physician. Stay in bed until he arrives. See that it registers less than 97 before using.

MALARIAL FEVER.

Malarial fever is an endemic infectious disease, caused by a parasite of the blood. The disease is transmitted to man (inoculated) by the bite of certain kinds of mosquitoes, of the genus *Anopheles*.

It is a disease of warm and temperate regions; very prevalent and of severe type in hot countries, especially along the seacoast and basins of rivers, but gradually declining in extent and virulence in proportion to the distance on either side from the Equator. In the Tropics the disease is constantly prevalent. In the cooler, or temperate regions, as, for example, along the coast of the Central Atlantic States, it is active only during summer and autumn. It is seldom developed at a lower temperature than 60° F. (15.5° C.), and even in the hot climates malaria is probably never contracted far away from land. The disease is said to be most frequently contracted during the night, just after sunset and just before sunrise being the most dangerous periods. It is, therefore, very important in infected localities not to permit the men to go ashore nor to allow them to sleep on deck if the vessel is lying near the land; or, if they must sleep on deck or other exposed places, to provide suitable protection by means of blankets and properly constructed mosquito bars.

There are different varieties and types of malarial intermittent fever: (1) Quotidian, when the paroxysm occurs every day; (2) tertian, when it occurs every other day; and (3) quartan, when it occurs every fourth day. The disease is popularly known as "fever and ague," "chills and fever," "the shakes," etc. It is characterized by recurring paroxysms, consisting as a rule of three distinct stages: The cold, the hot, and the sweating stage. The attack may be sudden or it may be preceded by a feeling of uneasiness, a desire to stretch the limbs and yawn, headache, loss of appetite, and sometimes by vomiting. The chill may be of any degree of severity. Patients sometimes complain only of chilliness or of a creeping sensation of coldness over the back. More frequently the chill is well marked; the feeling of cold spreads all over the body, the teeth chatter, the patient shivers, and his whole body shakes. This **cold stage** may last from a few minutes to an hour, or longer.

The **hot stage** gradually comes on as the cold stage subsides, and soon there is a feeling of intense heat. The face becomes flushed, the pulse full or bounding, the headache continues, and the patient is in high fever. This stage may last from half an hour to four or five hours, when perspiration appears, first on the forehead and gradually over the entire body, and the **sweating stage** is fully established. With the appearance of perspiration the fever declines, the distressing symptoms gradually cease, the patient experiences a feeling of great relief, and soon falls into a refreshing sleep. The dura-

tion of the sweating stage varies from one to three hours. It may be very profuse or very slight. At the end of the sweating stage the patient may be greatly prostrated or may feel quite well, and able to be up and about until the beginning of the cold stage of the next fit, twenty-four, forty-eight, or seventy-two hours from the beginning of the first.

There are three varieties of malarial fever—intermittent, remittent, and a very severe type known as pernicious malarial fever.

In the intermittent the paroxysms may recur at irregular intervals, the cold stage may be absent, the fever may come on gradually and decline to normal in the same manner.

When the attacks are prolonged, and when instead of declining to normal there may be only a slight fall in the temperature and slight sweating, the fever is called **remittent fever.**

Pernicious malarial fever, as the name indicates, is a very fatal disease. It occurs chiefly in hot climates, but is occasionally met with in temperate regions. It may be preceded by an apparently mild attack of intermittent fever or the patient may be taken suddenly with intense headache, high fever, wild or perhaps muttering delirium, rapidly passing into unconsciousness, and death may occur within a few hours from the beginning of the attack.

In another form of the disease the attack begins with extreme coldness of the surface of the body, with vomiting, or with severe diarrhea or dysentery, and the patient may die from collapse.

There is also a hemorrhagic form in which bleeding may occur from the nose, mouth, or gums. The urine may be bloody or quite dark in color, in some cases almost black. In tropical Africa and other hot countries where the disease prevails it is known as "blackwater fever."

Hemorrhages, however, may occur in any severe or prolonged form of malarial infection, and bloody urine (malarial hematuria) is not infrequently met with.

Treatment.—Quinine is the remedy, and quinine also acts as a preventive. In going to a malarial region, treatment should be commenced several days before arriving at port. To each man on board should be given at least 10 grains (0.6 gm.) of quinine daily for a period of one week. The allowance may then be reduced to 5 grains (0.3 gm.) or even to 3 grains (0.2 gm.) a day. The bowels should be kept freely open.

If a chill occur, the patient should at once be wrapped in blankets and given hot drinks. During the hot stage, cold drinks, lemonade, etc., may be given. As soon as the sweating stage begins, 10 or 15 grains (0.6 gm. to 1 gm.) of quinine should be given, and thereafter 5 grains (0.3 gm.) every six hours, for two or three days, and then con-

tinued in smaller doses, say 3 grains (0.2 gm.) three times daily, for the next two weeks.

If the chill is severe, or if the surface of the body is very cold, hot-water bottles or heated bricks or stones wrapped in cloth or in a separate piece of blanket should be placed to the feet. Mustard plasters may also be applied to the extremities and over the region of the heart, and hot stimulating drinks should be given.

If vomiting occur, a mustard plaster may also be placed over the region of the stomach, above the navel, and cracked ice may be given by the mouth. Headache may be relieved by cold applications.

If the hot stage is severe, a tepid bath may be given in a tub or by means of a sponge. If the temperature is very high, 105° or 106° F. (40.5° or 41.1° C.), a cold bath should be given.

In remittent and other severe types of malarial fever the treatment should be more active. No time should be lost in giving the quinine; 10 or 15 or 20 grains (0.6 gm. to 1.3 gm.) should be given immediately, and along with this, if the bowels are not freely open, a calomel tablet, one-tenth grain each, should be given every half hour until 10 have been taken. After the bowels move, the quinine should be continued in 5-grain (0.3 gm.) doses every four or five hours.

The symptoms and signs of typical malarial intermittent fever are so striking that they can hardly be mistaken for anything else. It must not be forgotten, however, that there are typical and irregular forms of malarial fever, and that they may be mistaken for other diseases, such as tubercle (consumption) of the lungs, abscess of the lungs or of the liver or any part of the body, or the result of the passing of a catheter, all of which produce chills or chilliness and fever.

Some forms of remittent or continued remittent malarial fever may be difficult to distinguish from typhoid fever. The remittent type may be mistaken for yellow fever.

Quinine is the remedy for any form of malarial fever. If the fever does not yield to full doses of quinine, it is probably not malarial. At any rate this is the most practical method for determining the question as to whether the fever is malarial or not. In the hospital or laboratory the diagnosis is made by microscopical examination of the blood.

The diet in any form of acute fever should be light, liquid, and nourishing; and if there is much prostration, stimulants will be required. Solid food should not be allowed.

MEASLES.

Measles is an acute infectious disease, which most commonly attacks children but may occur in adults. It usually spreads from person to person by exposure to a patient with the disease, as going into

the room where he is sick, riding in the same street car, or being in the same schoolroom. It generally makes its appearance from twelve to fourteen days after exposure. One attack is usually a protection against a second one.

It usually begins with the symptoms of an ordinary cold. There may be an initial chill; the patient's face looks flushed and sometimes slightly swollen about the nose and eyes, and the eyes are reddened. There may be a tendency to sneeze, and an examination of the throat will disclose a reddening of the mucous membrane. The rash often appears first in the throat. Some cough may be present at the onset, with more or less headache. Fever is generally present with the onset of these symptoms. The eruption on the skin develops on the third or fourth day of the fever. It may be most marked on the forehead or about the ears, looking like fleabites, and gradually spreads over the entire body. The patient has considerable cough with expectoration. In children there is some liability to a form of pneumonia called broncho-pneumonia, which renders the disease much more dangerous. It may also have the complication of diarrhea and vomiting, due to implication of the bowels and stomach.

As soon as a case is discovered it should be put in bed and isolated in a room, from which children should be excluded and only those adults admitted who are directly concerned in the care of the case.

It is necessary to protect the patient from becoming chilled, and he should not be exposed to drafts, but fresh air should be admitted to the room. If the weather is cold, he should be provided with plenty of covering.

The treatment of an ordinary case of measles is practically nil, as little or no medication is required. If there is much irritation of the eyes, it is well to have the room darkened and to wash out the eyes with a saturated solution of boric acid in warm water. Take a glass of warm water and put into it all the boric acid it will dissolve and use it as a wash for the eyes, keeping it covered to prevent dust or other impurities getting into the solution. Everything applied to the eyes should be scrupulously clean.

If the skin is dusky and the eruption is not well marked, the patient may be enveloped in sheets or blankets wrung from hot water, but care must be exercised that he does not become too rapidly chilled afterwards. Only sufficient covering should be used to render the patient comfortable.

If the cough is very troublesome, a tablet of brown mixture may be given three or four times a day.

After the eruption has disappeared and the peeling of the skin has begun, the patient should bathe daily in order that the skin may be freed from the scales. Children should not be allowed to approach the patient until after this scaling has entirely ceased.

During the period of the disease the patient may be fed on broths, milk, soft-boiled eggs, etc.

After recovery of a case of measles, the bedding should be disinfected by boiling twenty minutes or by soaking in a bichloride of mercury solution, 1 to 1,000, for two or three hours.

The hangings in the room and the rug or carpet, if any, should be disinfected, if possible; but if disinfection is not practicable, they should be hung out in the sunshine and well beaten before being used again. The room should be thoroughly cleaned and aired for several days.

MUMPS.

Mumps is an acute infectious disease usually affecting children, but may occur in adults. It affects the parotid gland, which is situated just below the ear on each side. It is usually conveyed by contact from one patient to another. Hence, the patient should be isolated in a room, and children should not be exposed to the disease. Only the adults directly in charge of the case should be admitted to the room unless they have been protected by a previous attack. An attack usually comes on about fifteen days after the exposure to the disease.

The chief symptoms are pain and swelling in the parotid region under the ear. Movements of the jaw, such as chewing and talking, will be painful. Swelling may occur on one or both sides, but nearly always both are involved. It is usually worst about the third day, and may gradually disappear after that. It is usually a very mild disease, but swelling of the testicle is a frequent complication in the male.

Treatment.—Light diet, such as broths, eggs, milk, rice puddings, etc., should be given. Sour food and acid drinks will be found to give considerable pain if taken in the mouth; hence, they should be avoided. Hot applications may be placed over the swollen glands if there is very much pain. No internal medicines are indicated. If the bowels are constipated, a tablespoonful of Epsom salts may be administered with benefit.

After recovery of a case of mumps, the bedding should be disinfected by boiling twenty minutes or by soaking in a bichloride of mercury solution, 1 to 1,000, for two or three hours.

The hangings in the room and the rug or carpet, if any, should be disinfected, if possible; but if disinfection is not practicable, they should be hung out in the sunshine and well beaten before being used again. The room should be thoroughly cleaned and aired for several days.

SMALLPOX.

Smallpox is an acute, contagious disease, characterized by an initial fever and successive stages of eruption. It spreads rapidly among persons unprotected by vaccination. It may be communicated by the breath, by exhalations from the skin, by clothing, or by anything that has been in contact with a person suffering from the disease. It is very contagious during the latter stage of eruption, and especially during the period of convalescence when the dried pus scales become detached from the skin and in the form of dry powder or dust settle on everything about the room or compartment, and may be conveyed not only to all parts of the ship or light station, but to any part of the world to which the ship is bound.

After a period of incubation of from eight to fourteen days, occasionally longer, the disease begins suddenly, usually with a chill, always with severe pain in the back and loins, intense headache, and high fever. Vomiting occurs in many cases. The bowels may or may not be constipated.

About the end of the third day or on the fourth day a papular eruption appears on the forehead, and frequently on the lips and the wrists, occasionally in the mouth and throat, and gradually extends to other parts of the body. The eruption begins as a bright red dot or spot slightly elevated above the surrounding skin, enlarging until the second day, when it forms a papule. The papule is hard to the touch, feels like shot under the skin. As soon as the eruption appears the temperature begins to fall, and the distressing symptoms subside. On the fifth or sixth day a small vesicle, with a depression of the center, appears on the top of each papule. The vesicles gradually become distended, the depressed centers rounded out, and about the eighth or ninth day the change is completed and the vesicles become pustules. They have a yellowish gray appearance and each pustule is surrounded by a red border. The skin between them is swollen, the eyes may be closed. During this change the temperature rises again, secondary fever sets in, the chief symptoms return, and a day or two later another change begins. The pustules break, matter oozes out, crusts form, first on the face and then over other parts of the body, following the order of the appearance of the eruption. The secondary fever may be quite high in the beginning, but gradually declines as the pustules change into crusts, and in favorable cases seldom lasts more than two or three days. The crusts then rapidly dry and fall off, leaving red spots on the skin and here and there the characteristic pockmarks or pits. The healing of the pustules is usually attended by troublesome itching.

In some cases a diffuse redness of the skin or red spots appear on the abdomen, or on the side of the chest, or on the inner surface of

the thighs as early as the second day, but the distinctive papular eruption makes its appearance, as stated, at the end of the third or on the fourth day and nearly always begins on the forehead.

In the confluent form of smallpox the eruption may appear a day earlier and all the symptoms are more severe. The pustules run together and form large brownish scabs, chiefly on the face and head, but also on the hands and feet. The face and neck are greatly swollen, the eyes are closed, the features are distorted. The patient complains of tension and burning of the skin; there is much thirst. The eruption may also appear in the mouth and throat. The secondary fever is high. Delirium may be quite marked. In fatal cases the pulse becomes rapid and feeble, and death occurs about the tenth or eleventh day or later.

In favorable cases, about the eleventh or twelfth day the pustules begin to break. The matter dries and forms crusts which slowly fall off, leaving the skin quite red and in many cases dreadfully scarred and pitted.

The crusts begin to drop off about the fourteenth day, but the process of desquamation may not be completed until the end of the third or fourth week, and the fever may persist during that period. There is a milder form of smallpox called **varioloid**, in which the symptoms are usually milder and of shorter duration. Varioloid occurs in persons who have been vaccinated. Sometimes the eruption begins on the feet. In some cases it is confined to the feet and hands. Occasionally the eruption is extensive and the symptoms are severe.

The most severe type of smallpox is the **hemorrhagic** (bloody). It occurs in two forms. In one the case goes on in the usual way until about the ninth or tenth day, when blood makes its appearance in the pock. This form is sometimes called **black** smallpox. In the other form the eruption may be blood-colored from the second day, and bleeding may take place from the nose or mouth or from the rectum. The face is greatly swollen and the eyes are deeply bloodshot. Death occurs during the first week, sometimes as early as the second day.

Before the characteristic eruption appears it is frequently very difficult to determine the existence of smallpox. It is easily confounded with other eruptive diseases. The important points to remember are the intense pain in the back, the high fever, and bounding pulse, all of which precede the eruption, and that when the eruption appears the fever and all the severe symptoms subside. The temperature before the eruption may be up to 105° or 106° F. (40.5° or 41.1° C.). When the eruption appears it begins to decline and within twenty-four or thirty-six hours is down to about 100° F. (37.7° C.). When the secondary fever sets in the temperature rises again.

Treatment.—The patient should be placed in a cool, well-ventilated room, and strictly isolated; and every person at the light station or on board the ship should be immediately vaccinated. No one should be allowed to come in contact with him except the nurse or attendant, and the nurse or attendant should not be allowed to come in contact with other persons. While in immediate attendance on the sick he should wear overalls and jumper, and a head covering, to be removed when he leaves the room, and immediately put on again when he returns. Separate dishes and necessary utensils should be provided. The food should be placed at a convenient place near the door of the sick room where the nurse can come and get it. Nothing should be allowed in the room except the articles absolutely necessary. The soiled clothing should be wrapped in a clean sheet (or in a sheet that has been dipped in a 1 to 1,000 solution of bichloride of mercury), and the bundle placed in a kettle of water and thoroughly boiled. If there is a sufficient supply of bedclothing the soiled articles should be destroyed by fire (burned). The patient must be kept thoroughly clean. Good nursing is very important.

In the early stage, when the fever is high, place the patient in a cold bath, or give him a cold sponge bath, note the temperature of the body, and repeat the bath every three hours if the thermometer registers above 103° F. (39.4° C.). If the bowels are constipated, give small doses of Epsom salts, 2 teaspoonfuls, every two or three hours.

The food should be soft and nourishing and given at regular intervals. Cold drinks, lemonade, barley water, etc., may be freely given.

The pain and tension in the skin may be relieved by cold applications. A piece of lint, wet with a cold 2 per cent solution of carbolic acid, may be applied to the face and frequently renewed. Holes should be cut into the lint corresponding to the eyes, nose, and mouth. When the pustules begin to form it is a good plan to touch each one with tincture of iodine (a camel's-hair brush may be used for the purpose), and a day later to puncture them with the point of a needle. The needle should first be boiled, and the point should then be dipped in tincture of iodine before making the puncture. When crusts begin to form, olive oil or glycerin should be applied. If the hair is long it should be cut short early in the disease before the pustular stage begins. The eyes must be carefully cleansed several times a day, else blindness may follow. A solution of boric acid, 5 grains to a fluid ounce of water, is a good eyewash. The mouth, throat, and nose also require attention. A saturated solution of boric acid may be used as a mouth wash and gargle.

When the crusts and scabs drop off they should be carefully gathered up and burned. The patient should then have a daily bath with soap and water. When the case is ended the room and all exposed

articles must be disinfected by burning sulphur (4 pounds to every 1,000 cubic feet of air space).

On shipboard if near port when the disease breaks out the ship should be taken direct to the quarantine station, where the patient may be taken care of and the ship disinfected.

DYSENTERY.

Dysentery, or bloody flux, as it is sometimes called, is an affection—an inflammation and ulceration—of the mucous membrane of the large bowel. It occurs in different degrees of severity. It may be acute or chronic. There are different varieties. Its severest form is met with in tropical countries, where it frequently occurs in widespread epidemics. Epidemics also occur in temperate regions. Sporadic cases may be found almost everywhere. The disease prevails in summer and autumn. It may attack an entire ship's crew.

Bad food, unripe fruit, impure drinking water, exposure to cold and dampness, while probably not in themselves the direct cause of dysentery, doubtless favor the operation of other causes.

Symptoms.—The onset may be sudden or gradual. There may or may not be chills or chilliness. There is usually some feverishness. The tongue is furred and moist, but soon becomes red and dry or brownish and glazed.

The first stools may be like those of an ordinary diarrhea. After a day or two, or maybe within a few hours, these are replaced by small mucous stools frequently mixed with blood and small particles of fecal matter. Soon the evacuations consist of mucus alone, or of blood and mucus, or of a jelly-like matter and small white clumps of mucus. Later they may be shreddy, and brownish or greenish in color. Patient complains of cramps and "colicky" pains in his belly; a burning sensation in the rectum, with a feeling as if something must be expelled, and of a constant desire to go to stool. The evacuations may number from ten to twenty, or forty to fifty, or even a hundred or more a day, according to the severity of the case. The quantity of each may not exceed a teaspoonful.

In mild cases there is a gradual change to normal, and patient may recover after a period of a week or ten days. Severer cases continue for several weeks or longer and then recover, or become chronic and incurable, or death may occur from general weakness.

Tropical dysentery, the variety which occurs most frequently and in epidemic form in tropical or subtropical regions, but also occasionally in temperate climates, is said to be produced by a microorganism which enters the system in drinking water.

The symptoms in this form of dysentery are similar to those already described. The burning sensation and bearing-down pain, however, are less marked. The stools are less frequent, but they

are larger and more watery; at times more like diarrhea than typical dysentery. The disease in favorable cases runs a course of from six to twelve weeks. Recovery is always slow. Death may occur from exhaustion, or from abscess of the liver, which is a common complication. In the most fatal epidemics the course of the disease is very rapid. Death sometimes occurs within a few hours.

Treatment.—Rest in bed. If possible, the patient should use the bedpan instead of the commode or closet, so as to insure the greatest amount of rest, which is very important. Stop all solid food. Give 2 tablespoonfuls (30 c. c.) of castor oil and 15 drops of laudanum in one dose, and, if necessary, repeat the dose in six hours, or give smaller doses at intervals of four hours. After the bowels have been thoroughly cleared out, a pill of camphor and opium should be given every three hours. Hot applications should be placed on the abdomen. The bearing-down pain and the burning sensation may be relieved by washing out the rectum with a pint of warm water and by injecting 2 ounces of thin starch containing 25 or 30 drops of laudanum.

In place of the castor oil, Epsom salts may be given in tablespoonful doses, repeated every two hours until a free and large action of the bowels results, and then the pill of camphor and opium given every three hours. Or, instead of the camphor and opium pills, bismuth subnitrate may be given in 30 or 40 grain (2 gm. or 2.6 gm.) doses.

After two or three days, if the disease continues, the castor oil or the Epsom salts may be repeated, and after its effect is produced, the same line of treatment continued.

The diet should be limited to the lightest articles, such as thin porridge, milk, and broths. And even in the lightest cases the patient should be kept warm in bed.

The best means of protection or prevention is to keep the body in sound condition. If the disease occurs among a ship's crew, the healthy men should be very careful not to catch cold, and to avoid errors in eating and drinking. Sudden changes of temperature should be guarded against by a proper supply of clothing. The drinking water should be boiled.

SUNSTROKE.

The term sunstroke denotes a sudden attack of illness from exposure or prolonged exposure to the rays of the sun; but the same condition may be produced in hot weather by exposure to high temperature not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Stokers on steamships are sometimes affected by the heat of the furnace. Men debili-

tated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.

Sunstroke occurs in two forms: **Heat stroke** (heat fever), in which the temperature of the body is very high, and **heat prostration** or **heat exhaustion**, in which the surface of the body is cool, sometimes considerably below normal. The difference is very important because of the different treatment required.

In severe cases of **heat stroke**, the patient may be stricken down in a state of unconsciousness and die instantly or within an hour or two. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot "burning" skin. The thermometer may register 105° F. Pulse is full and may be slow or fast. Breathing is labored, may be sighing or rattling. Patient soon becomes unconscious, the stupor deepens, and death may occur within 24 hours; or the temperature may drop, consciousness may return, and the patient get well.

In **heat prostration**, as already stated, the surface of the body is cool, the pulse rapid and feeble, and there is a feeling of general weakness. There may be only slight faintness and nausea, and under prompt treatment patient may rapidly recover, or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion.

Treatment.—In **heat stroke** (heat fever) the temperature of the body should be reduced as rapidly as possible. Remove the patient to the coolest and best-ventilated part of the ship or station. Place him in a cold-water bath, add ice, rub the body with the blocks of ice, apply iced water with ice cap to his head; and keep up the treatment until the temperature, as shown by the thermometer in the rectum, is reduced to 100° F. If the temperature rise again, repeat the treatment. If symptoms of exhaustion follow the reduction of the temperature, stimulants should be given—strychnia sulphate, one-fortieth grain.

In **heat prostration**, with cool skin, weak and rapid pulse, stimulants and friction are required. Give strychnia sulphate, one-fortieth grain, rub the surface of the body and the extremities, place hot-water bottles to the feet, and cover the body with blankets. If the head is hot, apply cold water to the forehead. If vomiting occur, inject the stimulants into the rectum. Apply mustard over the region of the stomach. Mustard may also be applied to the feet.

DIARRHEA.

Acute diarrhea is caused by acute inflammation or by irritation of the intestines. It may occur as a complication in many different diseases. It is usually one of the symptoms of typhoid fever. It is not infrequently met with in severe cases of malaria. It is called

functional or **simple diarrhea** when it occurs independently of any other appreciable disease. It may be caused by exposure to cold or by errors in diet.

In **simple diarrhea** there may or may not be griping and colicky pains. In the more severe forms the tongue is coated and there is some fever. Thirst is marked in proportion to the size and frequency of the thin or watery discharges. If the rectum is affected, there is a constant desire to go to stool, and a burning sensation and bearing-down pain, as in dysentery.

Diarrhea may last from a few hours to as many days, or longer. It may become chronic.

Treatment.—In all cases, **rest** and light diet. In the milder forms nothing further may be required. In the more severe forms it is a good plan to begin with a dose of 1 or 2 tablespoonfuls of castor oil, to which 10 or 12 drops of laudanum may be added, or in place of the oil and laudanum Epsom salts may be given. The diet should be limited to light articles, such as cornstarch, gruel, weak broths, soft-boiled eggs, milk, and thoroughly toasted bread. As a rule, in very acute cases, the less food and drink taken the better. The patient should rest in bed and keep his body warm.

After the bowels have been freely moved by the oil or salts, if the diarrhea or pain continue, give 1 camphor and opium pill, and, if necessary, repeat the dose after an interval of three or four hours. If nausea and vomiting occur, apply mustard to the region of the stomach, and give tablespoonful doses of equal parts of milk and limewater.

In **chronic diarrhea** careful attention to diet is of the greatest importance. The treatment is about the same as for chronic dysentery.

CHOLERA MORBUS (SPORADIC CHOLERA).

Cholera morbus is an affection of the stomach and intestines, attended by vomiting, purging, and cramps. It comes on suddenly, and may begin by vomiting or purging. It is usually met with during the hot months of summer. It is frequently caused by eating unripe and indigestible fruits and vegetables, decomposed or improperly cooked fish, shellfish, or salad mixtures. Drinking large quantities of iced water and sudden checking of the perspiration, or irritants of any kind, may set up the trouble. The disease usually begins suddenly, often at night, with vomiting, after a feeling of uneasiness, nausea, or a severe cramp. The contents of the stomach are first thrown up, then a bilious matter. The stools are at first solid or semisolid, but they soon become more watery, lose their color, and sometimes appear not unlike the rice-water stools of genuine Asiatic cholera. The patient soon has a wasted look. His thirst is unquenchable. His skin may become cold and clammy and the

pulse very weak. Cramps may occur in the feet and in the calves of the legs. The disease runs a rapid course. The acute symptoms may subside in a few hours. The attack seldom lasts more than twelve hours. Recovery is the rule, but treatment should be promptly applied.

Treatment.—Apply a large mustard plaster to the abdomen. Give 15 drops of laudanum. If the dose is rejected (immediately vomited), try it again. If it is still not retained, then try 2 tablets of "Sun Cholera Mixture." If vomiting quickly occur, then inject into the rectum by means of a glass or rubber syringe about 20 drops of laudanum mixed with a little thin starch or a little water. The rectal injection should be given immediately after an evacuation, and the patient should be instructed to hold it as long as possible. In whatever way the remedy is given the dose should be repeated in about one hour if the vomiting and purging continue.

It must not be forgotten, however, that all these remedies contain opium, and that if the patient is inclined to sleep or shows other constitutional effect of the drug the dose must not be repeated.

The nausea and thirst may be controlled by cracked ice placed in the mouth. Small quantities of carbonated water may be allowed. If the thirst is very urgent, a tablespoonful of iced water may be given at short intervals.

COLIC.

Intestinal or spasmodic colic.—These terms are applied to abdominal pain occurring in paroxysms of different degrees of severity. The pain is usually referred to the region of the navel or middle of the belly. It may be due to indigestible food, cold or acid drinks, poisons, gases, or any irritating substance. It is often preceded by obstinate constipation. Vomiting frequently occurs.

Another variety of colic, called **lead colic** or **painter's colic**, is caused by lead poisoning. It is not uncommon in painters or workers in lead. It may be caused by drinking water taken from leaden pipes. An attack may be mild or exceedingly severe. It is usually attended by obstinate constipation and by contraction of the abdomen.

The severe, paroxysmal pain attending the passage of a gallstone from the gall bladder to the intestine is called **biliary colic.** In biliary colic the pain is usually most marked in the region above the navel or about the stomach (epigastric region). The paroxysms begin and end suddenly. Severe nausea and vomiting occur. The skin and eyes may become yellow or of a yellowish hue (jaundiced), the same as in bilious colic. Gallstones may occasionally be found in the stools if carefully looked for. Some cases, however, are difficult to distinguish from ordinary intestinal colic.

The severe, excruciating pain caused by the passage of a small rough stone or calculus or particles of sandy substance from the kidney through the ureter to the urinary bladder is called **nephritic colic, kidney colic,** or an attack of "the gravel." The pain usually begins with a one-sided, boring backache. Suddenly it increases in intensity and shoots down the loin to the hip and thigh, and the patient writhes in agony until the "stone" or particle, sometimes not larger than the head of a medium-sized pin, reaches the bladder, when the pain suddenly ceases. The paroxysm may last from half an hour to a number of hours, or one or two days. It may not recur for months or years; on the other hand, there may be two or more paroxysms at comparatively short intervals.

Colicky pains are present in many different diseases. **Appendicitis** frequently begins with pain not unlike that of intestinal colic.

Treatment.—If the colic is due to indigestible food, or too much food of any kind, an emetic should be given, such as mustard and water.

After the stomach is emptied give a teaspoonful of aromatic spirits of ammonia in water. Apply a large mustard plaster or a hot poultice or cloths wrung out of hot water, or heat of any kind to the abdomen. (Local applications of hot water usually afford some relief in any variety of colic or wherever pain exists.) If the colicky pains persist, 10 or 12 drops of laudanum should be given by the mouth, and repeated, if necessary, in two hours; or 30 or 40 drops of laudanum in a little water or starch may be injected into the rectum.

If the bowels were constipated when the attack began, an injection of soap and warm water should be given by the rectum, or small doses of Epsom salts or castor oil may be given by the mouth. The diet for a day or two should be light articles in small quantities at a time. The treatment for **lead colic** is about the same, except that the constipation should be relieved at once by full doses of Epsom salts or castor oil. Apply heat to the abdomen or place the patient in a warm bath. Pressure applied to the abdomen affords some relief. Remove the cause or remove the patient from the cause of the disease.

In **biliary colic,** the bowels should be freely moved, patient should be placed in a hot bath, and laudanum, 30 drops, given to relieve pain.

In **nephritic** or **kidney colic,** hot baths and laudanum, 30 drops, are the remedies.

SCURVY.

Scurvy is a disease produced by improper or unsuitable food. Many years ago it was of frequent occurrence among seafaring men on long voyages. Now it is a comparatively rare disease, thanks to better provisions and better methods in issuing food supplies.

Symptoms.—Swelling, sponginess, and bleeding of the gums. The teeth become loose and frequently drop out. The breath is foul, the

tongue swollen. The skin becomes dry and scaly. Hemorrhages (small dark red spots) occur under the skin, first on the legs and then on the arms and other parts of the body. Bleeding from the nose frequently occurs. Swelling about the ankles is common. The skin of the legs is frequently discolored in large blotches, and there is often a peculiar hardness or induration of the muscles of the calf of the leg. The complexion is frequently of greenish or dirty-yellow hue. The pulse is rapid and weak. There may or may not be slight fever. The bowels may be constipated or there may be a troublesome diarrhea.

In severe cases debility and emaciation are quite marked. The mind wanders, and occasionally there is wild delirium.

Treatment.—This consists almost wholly in a change of diet. Give fresh vegetables, fresh milk, fresh beef, oranges, lemons, limes, or lime juice. Begin with small quantities at short intervals, and increase the allowance as rapidly as the stomach can take care of it. Pickles, onions, sauerkraut, raw potatoes, and raw cabbage are valuable articles in the make-up of a varied diet.

Potassium chlorate dissolved in water should be used as a mouth wash, and the gums should be frequently painted with tincture of myrrh. The skin should be kept in good condition by frequent bathing. The sleeping quarters should be clean and well ventilated.

SORE THROAT (TONSILLITIS, QUINSY).

Sore throat is a common disease. It is usually the result of exposure to wet and cold. Talking, laughing, or shouting in a damp, cold atmosphere is sometimes the cause of it. It frequently occurs in persons predisposed to rheumatism. It may accompany or be an extension from an ordinary "cold in the head." Sometimes the inflammation is limited to the mucous membrane of the pharynx and soft palate; it is then known as **pharyngitis** or **acute catarrhal sore throat**. More frequently the tonsils are affected, and the inflammation is then called **tonsillitis**. When the inflammation is more deeply seated in the tonsil and tends to suppurate or form an abscess the term **quinsy** is applied. An attack of sore throat may last from two to ten days, or longer.

Symptoms of acute sore throat are chilliness and feverishness, pain or soreness on swallowing, dryness, or a tickling or scratching sensation in the throat.

There is apt to be a stiffness and some tenderness along the side of the neck. If one or both tonsils are involved, as they usually are to a greater or less extent, the symptoms are more severe. In marked cases examination shows redness and swelling of the parts affected—swollen tonsils (tonsillitis) and white or cream-colored spots may be seen on the surface of one or both tonsils. (This form of the disease

is frequently mistaken for diphtheria.) There may be high fever and great prostration.

In the severest form of tonsillitis (quinsy) the tonsil is hard and swollen to twice or three times its natural size, and the patient is unable to swallow or to open his mouth beyond a fraction of an inch. The saliva dribbles away; if suppuration occur the tonsil gradually softens until the abscess breaks. With the discharge of the pus the severe pain is relieved and the patient rapidly recovers. If the abscess is large, and if the pus is discharged in a backward direction, there is danger from suffocation, particularly if the abscess breaks during sleep. Fortunately the abscess usually points toward the mouth, and the pus runs out.

Treatment.—Persons who are subject to attacks of sore throat should keep their feet dry and be very careful not to catch cold. If a case develop, give a gargle of salt water or potassium chlorate and water (saturated solution), or boric acid and water may be applied to the tonsil. Dry bicarbonate of soda (baking soda) is highly recommended as a local application, a small quantity to be applied every hour. Apply cold water or a light ice bag to the neck, or a thick piece of flannel saturated with ice water may be placed around the neck and covered with muslin. Small pieces of ice placed in the mouth are usually agreeable. The bowels should be kept open by means of Epsom salts.

If the cold applications to the neck do not give relief, or if they are not agreeable to the patient, apply hot water or poultices and give hot gargles, or let the patient gargle with hot tea. If the swelling is very great, he can not gargle. If practicable, send for a physician.

COUGHS AND COLDS.

When a person has a cough that lasts more than two or three weeks, even though the symptoms are very mild, the case is serious enough to require an examination by a physician, and one should be consulted on the first opportunity.

A case of bronchitis or bad cold usually begins with a cough, sometimes starting with an irritation in the throat, which gradually travels down into the lungs. Though the cough at first is dry, there will be some expectoration later on, especially marked in the morning on first arising. It may be at first white and tenacious, later on becoming yellowish. With this there will be some soreness over the upper and front part of the chest, and if the cough is violent there will be considerable soreness of the muscles between the ribs.

Treatment.—For the soreness over the chest, a good rubbing with soap liniment may help to relieve the symptom. A tablet of brown mixture given three or four times a day is serviceable, but not more

than 4 should be given during the 24 hours. The bowels should be kept open by a tablespoonful of Epsom salts, when necessary.

Patients with coughs and colds should not be kept in a hot, dry room without ventilation. Plenty of fresh air should be allowed to come into the room, with the precaution, however, that the patient be not exposed to a draft and that he be properly clothed so as not to become chilled when the weather is cold.

ERYSIPELAS (ST. ANTHONY'S FIRE).

Erysipelas is an inflammation of the skin. It usually begins with a chill, followed by a high fever. It is a frequent complication of wounds, but is more frequently developed without any apparent injury. A large majority of cases begin on the face, usually on the nose, first as a small red spot, which is soon elevated above the surrounding skin, and gradually or rapidly spreads over the face and ears, and not infrequently over the entire hairy scalp; sometimes over the neck and chest, and occasionally down the back and to other parts of the body. The skin is painful, red, hot, and swollen, and blisters frequently form. The swelling may be most marked about the eyes and ears, the eyes closed, and the patient's features changed and distorted to such a degree that the appearance once seen will not soon be forgotten. The disease limited to the face and scalp usually runs its course in a few days or a week, but sometimes before the face is healed red spots appear on other parts of the body, and the case may be prolonged. Abscesses beneath the skin are not uncommon.

Besides the symptoms already mentioned there are headache, loss of appetite, coated tongue, frequently vomiting, and in some cases delirium and marked depression.

The outcome is usually favorable, but in drunkards or in persons debilitated from previous diseases death is sometimes the result.

Treatment.—Erysipelas is only slightly contagious under ordinary circumstances; but persons suffering from wounds or scratches of the skin are very apt to be attacked. The patient should therefore be isolated—placed in a room by himself—and his attendant should be a healthy man and free from any skin injury.

Erysipelas being a self-limited disease, it is a common saying among physicians that the majority of ordinary or moderately severe cases would get well without any treatment. But this is probably true of many other diseases, and while it may be difficult, perhaps impossible, to limit the spread of the eruption or shorten the course of the disease in a given case of erysipelas, something may be done to relieve distressing symptoms and, particularly in feeble persons, to fortify the system against the attack. "Treat the patient rather than the disease" is good advice in more troubles than one.

The oldest and one of the best local applications for erysipelas is cold water, and if the fever is very high cold sponging of the entire body or a cold bath may afford considerable relief. Bismuth subnitrate may be dusted over, or petrolatum may be applied to the skin. In feeble persons stimulants may be required.

POISON IVY.

Contact of the skin with the poison ivy causes in many people a very annoying inflammation of the skin. The vine is of the climbing variety, with three pointed leaves on each stem. A few hours or about a day after the skin is exposed to the poison of this plant a red rash appears, with more or less swelling and itching; small blisters appear, filled with serum, even becoming quite large. When they burst, there is considerable weeping from the surface. Later it may go on to a formation of pus. The hands and face, being the most exposed parts of the body, and the feet and ankles of those who go barefooted, are usually first affected. If the inflammation is very severe, there may be some incidental disturbance, such as fever, headache, and general feeling of malaise.

Treatment.—One of the best treatments for this disease is bathing with salt water, sea water being the best. Weak alkaline solutions, such as boric acid, about 2 grains to the ounce, are good applications. The large blisters should be punctured and the contents allowed to run out. Every one or two days the affected parts should be bathed with warm water, carefully dried without rubbing, and the alkaline treatment resumed.

RHEUMATISM.

There are different forms of rheumatism and some of the forms have several different names. **Acute rheumatism, acute articular rheumatism, inflammatory rheumatism,** and **rheumatic fever** are terms applied to one and the same disease. A milder form of the affection is called **subacute rheumatism.** In this form the symptoms are less severe, but the disease is more prolonged. It may continue for a long time and become chronic. **Chronic rheumatism,** however, or the different affections and deformities of joints to which this term is frequently applied, may develop independently of any acute or subacute attack.

The term **muscular rheumatism** indicates an affection of the muscles as distinguished from joint affections. Lumbago and stiff neck are varieties of muscular rheumatism. The muscles, however, to a greater or less extent may be involved in any form of rheumatism.

Other conditions simulating rheumatism, occuring in connection with or directly due to gonorrhea or to syphilis, are called gonorrheal rheumatism or syphilitic rheumatism, as the case may be.

Acute rheumatism (rheumatic fever) is a comparatively common disease in all climates within the Temperate Zone. It occurs chiefly during the winter and spring. Exposure to a cold, damp atmosphere is the most frequent exciting cause in persons predisposed to the disease.

It may or may not begin with a chill or with a sore throat. The larger joints are usually affected. Swelling, heat, redness, tenderness, and pain are the chief symptoms. The inflammation is apt to shift from one joint to another. The pain and fever are usually increased in proportion to the number of joints involved. The majority of cases are attended with profuse perspirations, scanty, highly acid urine, coated tongue, and constipation. The heart is frequently involved.

Treatment.—Wrap the joint in cotton or flannel; keep it very quiet—the slightest movement aggravates the pain. Flannel wrung out of hot water and applied to the joint sometimes affords relief. Soap liniment may be applied if the pain is severe, or cold applications may be applied if agreeable to the patient.

Place the patient in a good bed, and let him wear flannel next to his skin. Change the flannel frequently, and bathe the body with tepid water.

For internal medication give salicylate of soda in doses of 10 to 15 grains (0.6 gm. to 1 gm.) every two hours until about eight doses are taken or the pain is relieved, then give it in smaller doses of from 3 to 5 grains (0.2 gm. to 0.3 gm.) every six hours.

The food should be soft and nourishing and given every three hours. Epsom salts should be given to keep the bowels open. The patient should be kept in bed for a few days after the symptoms have subsided. The duration of the disease is very uncertain. The acute symptoms may subside in a few days and the patient may be up and about in a week or ten days, but relapses are common and the acute may pass into the subacute or chronic form.

In **chronic rheumatism** there is stiffness and pain. A cracking or grating sound is frequently produced when the joints are suddenly moved. In severe cases the joints become enlarged and distorted. The deformity is sometimes very great.

The treatment consists chiefly in local application of liniments, etc., which afford relief because of the rubbing (massage) by which they are applied. Severe pain in the joint may be relieved by cold applications (flannel wrung out of iced water, applied to the joint and covered with muslin). Hot applications to the joints are sometimes of value. Belladonna plaster may be applied.

Five to eight grains (0.3 gm. to 0.5 gm.) of potassium iodide in a glass of water may be given three times a day between meals.

The general health should be looked after. The skin should be kept in good condition by frequent baths of tepid water. The bowels should be moved at least once a day. Patient should be allowed good food. Fresh air is also important.

In **muscular rheumatism** the muscles most frequently affected are those of the back (lumbago), side of neck (stiff neck or wry neck), and side of chest (pleurodynia). Exposure to cold, sudden cooling of the body—especially after active exercise, and sitting in a draft of air—are the chief causes, or exciting causes.

As a rule there are no symptoms other than the stiffness and pain on motion. The muscles may be slightly swollen, and very sensitive. Sometimes the attacks come on suddenly and apparently without cause, or following a slight twist or strain, as a "kink in the back," or patient may wake up in the morning with a stiff neck.

Treatment.—In acute cases salicylate of soda may be given in 5 or 10 grain doses (0.3 gm. to 0.6 gm.) every three hours until four or six doses are taken. Apply hot applications, dry heat, hot-water bag, or a hot poultice locally, or the heat may be applied by a flat-iron, over folds of flannel or a piece of blanket, and the rheumatism "ironed out." Later apply liniment with friction (massage). Keep the affected muscles at rest. If the muscles of the chest are affected, apply strips of adhesive plaster, the same as for fractured rib. Acute attacks are of short duration, but relapses are not uncommon, and chronic forms are frequently met with. Good food, fresh air, and attention to the general health are especially important in the treatment of chronic muscular rheumatism.

Gonorrheal rheumatism (gonorrheal inflammation of joints) may occur during an acute attack of gonorrhea, but it is more frequently associated with chronic gonorrhea or gleet. One or several joints may be affected. There may or may not be considerable fever. If only one joint is affected it is apt to be the knee or the ankle. In chronic cases the pain is sometimes centered in the heel. The attack may begin in the wrist, elbow, or shoulder. The disease is not always limited to the joints. Sometimes the inflammation is in the tissues outside the joint proper, in the sheaths of the tendons of muscles, or in the fascia of the soles of the feet. The swelling is frequently quite marked. In chronic cases there may be effusion ("water on the joint"). In very severe cases suppuration occurs (abscess forms). The eye and the heart may also be seriously involved.

Treatment is not very satisfactory. Give from 5 to 10 grains (0.3 gm. to 0.6 gm.) potassium iodide in a little water between meals. Keep the joint at rest. Apply a flannel bandage. Change it frequently and wash the joint with hot water and soap. In chronic cases liniments and passive motion should be applied. Tincture of iodine may be painted over the joint.

Syphilitic rheumatism, so called, is associated with secondary or tertiary syphilis. The joints and the shafts of long bones may be affected—thickened and painful. The pain is always worse at night.

The **treatment** is by potassium iodide, beginning with 10 grains (0.66 gm.) of potassium iodide three times a day between meals. Good food and attention to the bowels are important.

FAINTING.

Treatment.—When a person feels faint, or actually faints, he should be laid flat upon the bed or the floor, with the head at least as low as the body, and the clothing around the neck and chest loosened. A teaspoonful of aromatic spirits of ammonia should be given in a third of a glass of water. He should remain in this reclining position until the attack has passed off.

DELIRIUM TREMENS.

Delirium tremens occurs as an incident in the life of persons addicted to the excessive use of intoxicating liquors.

Loss of appetite, sleeplessness, or a marked mental depression are the chief symptoms of the first stage of the affection which is known among drunkards as "the horrors."

As the disease advances the patient talks incoherently; has a wild expression; his mind wanders from one thing to another. He answers questions in a rambling manner. He fancies he is being pursued by wild animals or that he sees rats, snakes, and the other animals crawling on the walls or around his bed, or he may imagine himself to be engaged in his regular duties or as master of the ship, giving directions to the men.

The delirium is always worse at night, but the patient requires careful watching all the time. He may try to jump overboard or commit suicide.

Delirium tremens may be confounded with acute inflammation of the brain or with acute mania (insanity) or with certain forms of pneumonia, and any one of these diseases may also be present. Pneumonia is a frequent complication of delirium tremens, and in fatal cases may be the direct cause of death.

In favorable cases the symptoms begin to improve in three or four days from the onset. The patient sleeps and gradually recovers.

Treatment.—The patient requires constant attendance. Physical restraint should be avoided if possible. To support the patient and to procure sleep are the great objects of treatment. Careful feeding is very important. Milk or concentrated broths should be given at regular intervals of two hours. A cold bath is of value in some cases, especially if agreeable to the patient. In other cases a warm bath or a hot foot bath may have a better effect.

The serious symptoms are largely, if not entirely, due to the sleeplessness, and if several hours of sound sleep can be procured improvement is almost sure to follow. To this end potassium bromide in 30-grain doses may be given in water every three hours. Morphia or opium are not to be recommended in this disease except under the immediate direction of a physician.

APPENDICITIS.

Appendicitis is an inflammation involving the appendix vermiformis. This is a small attachment of the large intestine situated in the right groin. It may begin suddenly with violent pains in the right groin, some fever, collicky pains, nausea, and vomiting. The seat of the pain is usually on a line drawn between the bony prominence (the large bone of the pelvis) just above and on the outer side of the right groin and the umbilicus. As the attack progresses, that region of the abdomen may become hard like a board and exceedingly sensitive to the touch. Often you will find that the patient flexes the right leg on the abdomen, and the effort to straighten it out causes him great pain. Sometimes the attack is much milder with only an uneasy sensation in the right groin, very slight fever, if any, and a sense of tenderness over the part affected. This pain may be in the pit of the stomach or about the umbilicus.

After this pain has been present for a few days a swelling in the right groin may appear, due to the formation of pus or to a large protective exudation of lymph.

Treatment.—The right course to pursue in a case of appendicitis is to call in a surgeon. If the services of a surgeon or physician can not be secured, the plan of treatment should be as follows: Absolute rest in bed with an ice bag over the appendix, to be continued during the stage of severe pain. Do not give purgatives. Reduce the allowance of food and drink of all kinds to the lowest possible limit. If the pain is very severe, 20 drops of laudanum in a little water may be given to control it. If the bowels move, a bed pan should be used, and under no circumstances should the patient be allowed to get up.

SYPHILIS.

Syphilis is a constitutional disease. It is contagious, or communicable, and is usually acquired during sexual contact. It may, however, be contracted in many different ways, direct and indirect. It begins by a primary lesion or sore called a **chancre** at the seat of inoculation (where the virus enters), and is followed by eruptions of the skin of different forms and different degrees of severity and variable duration. Sores also appear at the angle of the mouth, and **mucous patches** develop on the lips, tongue, inner sides of the cheeks, and sore throat is very common.

Mucous patches or **syphilitic warts** are also frequently seen about the anus or in any region where the skin is moist. The hair frequently falls out, the eyes are sometimes seriously involved, and sooner or later every organ in the body may become affected. A man suffering from syphilis in active form should not be allowed to go on board a ship, and if the disease breaks out while on the voyage he should be isloated, or at least be compelled to use separate drinking cups, knives, spoons, forks, towels, etc. He should under no circumstances smoke the pipe belonging to another man nor allow another man to smoke his. All his belongings should be kept strictly to himself, for unless the greatest care is taken other men of the crew will suffer. Chancre of the lip may be acquired by smoking the pipe of a syphilitic.

The primary or initial lesion of syphilis (the hard chancre) usually appears about three weeks after exposure, but may be as early as ten or twelve days or as late as five or six weeks. It begins as a red spot or papule, which usually breaks and forms a small ulcer with hard edges; sometimes the sore appears as a simple excoriation or superficial ulcer without hard edges. The neighboring lymph glands become, in the course of a week or two, enlarged and hard. They seldom suppurate. About two months later the skin eruption and other secondary symptoms begin. The lymph glands above the elbow, along the side and back of neck, and all over the body are usually enlarged. Patient frequently complains of headache and pain in the limbs, always worse at night, and may have slight, occasionally considerable, fever.

Treatment.—For the primary sore bathe the part with soap and water and dust boric acid over it twice a day.

If secondary symptoms, eruptions of skin, etc., appear, give a pill of calomel, one-fifth grain, three times a day. The mouth and teeth should be kept clean by means of a soft toothbrush and castile soap and water, or water to which a small quantity of bicarbonate of soda (baking soda) or tincture of myrrh has been added. If mucous patches appear in the mouth, smoking must not be allowed. If on board ship, as soon as the ship arrives in port send for or take the man to the marine-hospital office and receive the advice of a surgeon as to further treatment.

SOFT CHANCRE (CHANCROID).

Soft chancre or chancroid is a virulent ulcer. It usually begins within thirty-six hours after exposure, first as a red spot, but rapidly developing into an ulcer covered with thick yellowish pus. The period of development is about three or four days. Sometimes a week elapses from the time of exposure to the development of the sore, and occasionally a period of incubation is as long as ten days.

A sore appearing within a few days or a week or even as late as ten days after the exposure is usually regarded as a chancroid; but in practice this is not a safe rule, for the reason that many venereal sores are of a mixed character. The inoculations of both poisons may take place at the one and same spot—the result is a mixed chancre; or if two sores appear, the orgin of one may be syphilitic, the other chancroidal. It is therefore difficult, if not impossible, in many cases to determine the character of the disease from the period of incubation or from the appearance or local characteristics of the sore. A mixed chancre is a syphilitic chancre (a hard chancre), while its appearance may be precisely like that of the soft chancre or chancroid. The only safe plan is to regard all venereal sores as suspicious. But while this is true, treatment for syphilis should not be commenced before the appearance of secondary symptoms, for unless such symptoms appear it is impossible to determine that syphilis really exists in any case. The **mixed chancre**, as already stated, is essentially a syphilitic chancre, and the beginning of constitutional disease. Its local effects, however, may be precisely the same as those of soft chancre or chancroid. The ulcer (or ulcers—sometimes there are two or more) may remain as small as a pea or grow as large as a quarter, and if it becomes phagedenic (eating) may spread over a large surface of the body. It is also proper to state that a **secondary** syphilitic sore may appear under the foreskin, as well as at any other place on the body, and that cancer (epithelioma) of the organ may begin as a small ulcer. The latter, however, is a rare disease as compared with the different varieties of chancre.

The most frequent complication of soft chancre or chancroid is inflammation of the lymph glands of the groin (bubo), known to the sailor as "blue balls." Another troublesome and serious complication is the elongation and contraction of the orifice of the foreskin (phimosis), on the inner surface of which the sores may be located, and the swelling and tension may be so great as to produce gangrene (mortification). If the foreskin is very tight and pulled back and can not be brought forward again, the condition is known as paraphimosis, which produces great swelling, the same as if a string were tied around the organ, frequently resulting in severe ulceration and destruction of tissue. This condition may also be the result if the inflammation and swelling are marked and the foreskin very tight.

The sore should be dried and covered with a small piece of aseptic gauze or absorbent cotton, and later a dusting powder of boric acid may be applied.

If phimosis exist, the cavity of the foreskin should be syringed out with hot water, and if there are sores under the foreskin which can not be reached by the acid the cavity should be syringed with

a solution of one part of carbolic acid to forty parts of water (1 to 40). Soft chancres or chancroids appearing at the anus or rectum should be treated by frequent washings of warm water and the application of calomel.

In all cases, wherever the sore is located, cleanliness must be insisted upon, and, as already stated, in nearly all inflammations of whatsoever character, hot water alone is a valuable remedy; and rest in bed is of equal importance. If a lump (bubo) appear in the groin, rest in bed is of the greatest importance. The diet should be light but nourishing. Tincture of iodine, pure or diluted one-half with alcohol, may be painted over the lump, but it is not of much value. Rest is the important thing. If the bubo go on to suppuration, it should be carefully opened with the point of a knife, and kept open by a strand of aseptic gauze, which must be frequently changed, and enough aseptic gauze should be placed on top of the wound to absorb the discharges. The soiled gauze should be burned, and the person handling it must be careful to wash his hands in soap and water and in one of the antiseptic solutions already referred to. The patient's bowels should be moved once a day.

GONORRHEA (CLAP).

Gonorrhea is a specific inflammation of the urethra due to a microorganism, called gonococcus. It usually begins during the first week after exposure, sometimes as early as three or four days, and occasionally as late as ten days or two weeks. The first symptoms are a tickling or itching sensation and a slight swelling about the lips of the orifice of the urethra. A purulent creamy colored discharge soon appears, and a burning or stinging pain attends the passage of urine. The inflammation gradually extends to the deeper parts of the urethra, and, unless checked by medication, reaches its height about the end of the second or during the third week. The patient may experience great difficulty in passing water. If the inflammation run very high, abscesses may form in the tissues around the urethra, and swelled testicle and bubo are frequent complications; also painful erections and bending of the organ (chordee). Phimosis or paraphimosis occurs if the foreskin is tight or becomes involved in the inflammation.

If phimosis occur, and if the cavity of the foreskin is not thoroughly and frequently washed out, " venereal warts " are apt to form.

True gonorrhea, if carefully treated, gradually subsides and recovery may take place in from four weeks to two months. A urethral discharge that recovers in a few days or a week is probably a simple urethritis.

Gonorrhea is urethritis (inflammation of the urethra), but urethritis is not necessarily gonorrhea.

Treatment.—Rest in bed, light diet, plenty of water to drink, regularity in eating and sleeping. Keep the bowels open by taking a moderate dose of Epsom salts in the morning. Avoid strong coffee and tea, all stimulants, and greasy articles of food. Keep the body and mind at rest. Bathe frequently in hot water. Be very careful not to carry any of the pus from the urethra to the eyes. (Gonorrheal inflammation of the eyes is a very serious disease, which not infrequently results in total blindness and loss of the eyes.)

Give a copaiba capsule three times a day. If much pain in the back or over the region of the kidneys follow the use of the copaiba, it must be discontinued for a time or the dose lessened.

If the chordee is troublesome, apply cloths wrung out of cold water.

A snug suspensory bandage worn from the beginning may prevent the complication of swelled testicles. If the patient is lying in bed, the dragging of the testicles should be prevented by placing them on a support. The best local remedy for swelled testicles is heat, which may be applied by pieces of cloth or flannel wrung out of hot water.

STRICTURE OF THE URETHRA.

True or organic stricture of the urethra is a narrowing of the tube. It is commonly the result of long-continued or neglected gonorrhea. Stricture of the urethra may be produced by direct injuries, as kicks or falls on the perineum, or by the use of too strong injections, or by the careless passage of instruments.

Occasionally stricture results from simple urethritis, not gonorrheal, and symptoms not unlike those of stricture are sometimes caused by a stone in the bladder obstructing the passage, and by an enlarged prostate gland.

Gonorrheal stricture of the urethra is usually of slow development. It may be several months or years after the attack of gonorrhea before the patient becomes conscious of any change in the size or shape of the stream. First there may be only a twisting or flattening of the stream. In severe cases it gradually becomes smaller and smaller, until it is no larger than a knitting needle and passed with great difficulty, or it comes away drop by drop, and finally results in complete retention. One of the earliest symptoms of stricture is a gleety discharge from the urethra.

Occasionally retention of urine is the first symptom of the disease.

Sudden retention may be due to spasm of the urethra (spasmodic stricture).

Spasmodic stricture may occur independently of any specific disease of the urethra, but it is more frequently a complication of organic stricture. Exposure to cold and wet (catching cold), or a debauch, are the usual exciting causes.

When retention occurs the bladder gradually becomes distended and a fullness or distinct tumor may be felt in the lower part of the abdomen, which in severe cases may extend as high as the navel. Sometimes there is an involuntary flow, or an overflow of urine from a distended bladder—patient says he can not hold his water, and in such case it may be difficult to convince him that he is suffering from retention, until a catheter is passed and a quantity of urine is withdrawn.

Treatment.—A neglected stricture of the urethra is a serious disease, the treatment of which is very difficult in many cases, even in the hands of the most experienced surgeon.

If a case is allowed to run on until there is an actual stoppage or retention of urine, unless this condition is relieved the consequences are extremely serious and death may be the result.

Place the patient on his back with his knees slightly drawn up, and try to pass a catheter. The instrument should first be thoroughly cleansed by placing it in boiling water. It should then be oiled with

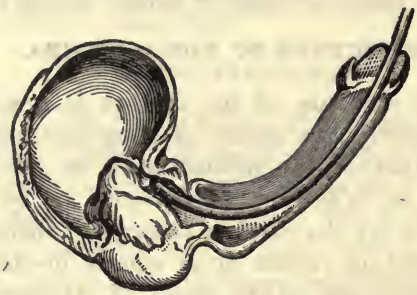

FIG. 1.—How to use catheter; shows the curve of the channel through which the catheter must pass.

olive oil, and carefully passed into the urethra and effort made with the greatest gentleness to pass into the bladder. (Fig. 1)

Try the largest size catheter (about a No. 10 English) first; if this fail, try the smaller ones. If a catheter can not be passed at the first trial, place the patient in a hot bath, give him 20 drops of laudanum, and an hour or two later try the catheter again. If it is not practicable to place the patient in a full bath of hot water, then cover his belly and other parts of his body with flannels wrung out of hot water and change them every fifteen minutes. The object of the hot bath and the laudanum is to produce relaxation. Sometimes a patient will pass his water in the bath. If, however, the symptoms are very urgent, if the patient can not pass any water, and after the most careful and gentle manipulation the catheter can not be passed into the bladder, the services of a surgeon should be secured.

BOILS.

A boil is a circumscribed inflammation of the skin and connective tissue. It is often caused by infection following a slight wound or scratch of the skin, but may occur apparently without any cause. It begins as a small red pimple and gradually increases in size and forms a dusky red swelling, the size of a silver dollar or less. The central portion of the swelling sloughs or forms a "core," and as soon as the core is separated or cast off the inflammation subsides, the pain lessens, and the ulcer begins to heal.

Treatment.—Hot applications, frequently renewed, until the central portion of the boil is softened. Then the separation of the core may be aided by an incision. The incision should be made by a thin blade, thoroughly boiled before it is used. After the core is discharged the ulcer should be dressed with aseptic gauze, held in place by a bandage.

PILES.

Piles are varicose dilatations of the veins of the rectum. The symptoms may be slight or severe. Inflamed piles are very painful. There is a constant burning sensation at the anus, which is greatly increased during and immediately after each movement of the bowels. When the veins rupture you have "bleeding piles." Occasionally the inflammation of a nodule results in an abscess.

Treatment.—Piles are frequently due to habitual constipation, and when that condition is improved the piles often disappear, or at least cease to be troublesome. The bowels should be kept in good condition. One easy movement should take place regularly every day. This desirable habit should be brought about by careful attention to diet and by drinking water in the morning before breakfast rather than by the use of cathartics.

In acute attacks, if the bowels are constipated give a full dose of epsom salts; put the patient on light, soft diet. Apply ice to the anus or inject cold water into the rectum. A hot application is sometimes very grateful. If the piles protrude, especially if they become strangulated, they should be pushed back with the finger; olive oil or petrolatum may be applied. If the piles are large and persistently painful, see a surgeon and have them removed by operation, which is the only sure cure.

INJURIES—HEMORRHAGE (BLEEDING).

In all cases of injury careful examination should be made of the part, after carefully washing the hands.

Hemorrhage is of three kinds—arterial, venous, capillary.

Arterial (bright-red blood from arteries in jets or spurts).

Venous (dark-red or purple blood welling out or flowing from veins in steady stream).

Capillary (blood oozing from the capillaries over the general surface of a wound).

If the bleeding is by jets or spurts, pressure should immediately be made above the wound by the thumb or finger, or better by tying rubber tubing around the limb, or, in the absence of such a tube, a bandage, handkerchief, suspender, strap, or soft rope may be used to stop or lessen the flow of blood; the blood vessel should then be seized and drawn gently forward with a pair of artery forceps and the ends tied with silk ligature in a reef knot, when the tubing or strap should be loosened or removed.

If the blood vessel is torn but not completely divided, tie a silk ligature around the vessel on each side of the wound.

Straps or bandages applied to control or lessen the danger of hemorrhage must always be placed above the wound—that is to say, between the bleeding point and the heart. In wounds of the foot, for example, if the arteries spurt, pressure should be made in the hollow back of the knee. If the blood is flowing slowly or oozing and does not come by jets or spurts, aseptic gauze or lint wrung out of hot water should be applied and firmly bandaged over the wound, or hot water may be poured over the wound before applying the aseptic gauze or lint. In any case it is well to cleanse the wound with hot water. The oozing may also be stopped by exposing the wound to fresh air and by allowing a stream of cold water to fall upon it, and then applying pressure.

Before beginning the treatment of any wound or any bleeding point, the operator must carefully cleanse his hands and arms, also the wound and surrounding parts, and the instruments and silk ligature should be boiled, as will be described under the head of wounds.

In the after treatment of severe bleeding the patient should be kept perfectly quiet in mind and body, his head should be lowered by raising the foot end of his bed or bunk. Give him plenty of fresh air, but keep his body warm and give him hot drinks. After reaction the temperature of the body may rise a degree or two above normal, but if this should continue longer than two or, at most, three days, the dressing should be removed and the wound thoroughly irrigated, first with hot water, then with a solution of bichloride of mercury (1 to 5,000), and dressed with aseptic gauze.

WOUNDS.

Incised wounds inflicted by sharp cutting instruments may, after the bleeding has been stopped, be drawn together with the fingers or with a needle and silk ligature, a thin layer of absorbent cotton applied over the wound and held with adhesive plaster. Strips of

adhesive plaster may be used over the dressing. The parts should be thoroughly cleansed, first by scrubbing with hot water and soap—the skin to be shaved if hairy—then washed with grain alcohol (not wood alcohol) and then again with hot water before the edges are drawn together. The needle and silk ligature and all instruments should be boiled before they are used. The operator must roll up his sleeves, scrub his hands and arms with hot water and soap, clean and trim his finger nails, scrub again with soap and water, then with grain alcohol (not wood alcohol), and finally soak his hands in a solution of bichloride of mercury (1 to 1,000) before beginning the operation. The wound, if deep, should not be completely closed; one end should be left open for drainage unless the patient is under the direct care and treatment of a surgeon.

Contused and lacerated wounds with torn and ragged edges, especially if the surrounding parts are bruised or crushed, should not be drawn tightly together. The bleeding from lacerated wounds at the time of the accident is not so profuse as in incised wounds, but the shock is greater, and very troublesome and serious hemorrhage may come on within a few hours or later. To guard against this the wound should be carefully examined (the operator's hands and all instruments to be first prepared as above described), and if any blood vessels have been torn they should be tied with silk ligatures, though they may not be bleeding at the time. The wound should be scrubbed off with soap and warm water, and then with grain alcohol (not wood alcohol), and finally with a solution of bichloride of mercury (1 to 5,000). Thick layers of clean (aseptic) gauze dressing should then be applied and held in place by means of a bandage. If the wound is large, the edges of a portion of it may be carefully drawn together. A strand of aseptic gauze should then be placed in the bottom of the wound and allowed to project through the opening, so that it may drain into the layers of gauze placed on top.

When dressings become soaked with the discharges they do more harm than good; they must, therefore, be changed as soon as the soaking is apparent, and the change must be made with all the aseptic precautions exercised in the operation. Clean hands, clean instruments, clean dressings, clean everything, are the watchwords. Water that has been boiled is perfectly safe, and boiling is the best disinfectant for instruments.

The stitches may be removed from a wound about the fifth or sixth day, or earlier if they begin to cut or irritate. If the wound is large, they need not all be taken out at the same time.

Gunshot wounds are frequently more or less contused and lacerated, and unless one of the main blood vessels is divided, or the lung or other internal organ penetrated, the bleeding is slight. The general treatment for such wounds is about the same as for other

lacerated wounds already described, but if the materials for thoroughly cleansing the wound are not readily at hand, and if there is not much bleeding, the wound had better be let alone, simply covering it with aseptic gauze until the patient can be placed under the care of a surgeon. No effort should be made by anyone other than a physician to find or feel the bullet or other missile by a probe or other instrument, especially if the wound is in the chest or abdomen, as there is more danger in searching for it than in leaving it where it may be lodged. The wound made by a Mauser bullet not infrequently looks as if made by a large needle—a punctured wound.

Punctured wounds are made by a narrow sharp-pointed instrument, e. g., pin, needle, dagger, or point of a knife or stiletto. They may penetrate to any depth, and if the instruments are clean and no large blood vessels or nerves have been wounded, withdrawal of the instrument may be followed by rapid recovery. But if such wounds are produced by irregularly shaped blunt instruments, or by nails or splinters of wood, and especially if contaminated by any poisonous material, the walls of the wound track are at once dangerously contused, lacerated, and infected, and if large blood vessels, nerves, or other organs have been injured the danger is very great, and the patient should be placed under the care of a surgeon as soon as possible, for unless the master or keeper is sufficiently familiar with the nature of such wounds and the anatomy of the part to lay it open to the bottom by additional incisions, he can do little more than apply aseptic dressings to the surface and keep the patient quiet.

BURNS OR SCALDS.

Burns or scalds are serious and dangerous to life in proportion to the extent and depth of the injury. A burn covering a large area and producing mere reddening and swelling of the skin is as serious as a burn one-half the size in which the skin is destroyed. The danger is from shock, from fever following reaction, from hemorrhage following sloughing, and from congestion and inflammation of internal organs. Burns of slight extent or moderate degree are not so dangerous, and most of the cases commonly met with will recover. But all cases require careful treatment.

Treatment.—For shock give strychnia sulphate, one-fortieth grain. In slight or moderate burns apply clean cloths wet with warm saturated solution of bicarbonate of soda (baking soda). In severe burns cut away the clothing, avoid exposure to cold, wash the part with warm saturated solution of bicarbonate of soda, or with solution of boric acid. The parts burned or the entire body, except the head, may be kept immersed in tepid or warm water for days.

Prick the blister with a clean (aseptic) needle, but do not remove the cuticle. Sprinkle with dry bicarbonate of soda or with powdered boric acid and dress the part with thick layers of clean (aseptic) cotton. (Cotton may be rendered aseptic by heating it in an oven to a point just short of burning.) The dressing should be changed only when absolutely necessary. Keep the patient quiet and his bowels active. Pain or restlessness may be relieved by laudanum, 20 drops, repeated in two hours if necessary. Carron oil (equal parts of olive oil and limewater) is an old remedy that affords considerable relief if applied to the surface. Petrolatum is also sometimes used. The scars resulting from burns and scalds always contract, and in severe cases terrible deformities are produced. These may be prevented to some extent by active and passive motion and by splints.

EFFECTS OF COLD—FROSTBITE.

Severe cold depresses the action of the heart—suspends the circulation. These effects are first noticed in the ears, nose, fingers, and toes. Numbness and tingling are the first symptoms, then loss of sensation. If not too long exposed, the circulation may be restored by proper treatment. But if the exposure is long continued, or if the cold is very intense, the parts are hopelessly frozen and gangrene will be the result. The parts may look all right for a few days after reaction, and then become discolored, bluish, and finally black. Another effect of extreme cold is an overpowering sense of drowsiness, but to lie down under such circumstances and go to sleep is almost certain death.

Treatment of frostbites.—1. Do not bring the patient to the fire nor bathe the parts in warm water.

2. If snow be on the ground, or accessible, take a woolen cloth in the hand, place a handful of snow upon it, and gently rub the frozen part until the natural color is restored. In case snow is not at hand, bathe the part gently with a woolen cloth in the coldest fresh water obtainable—ice water if practicable.

3. In case the frostbite is old and the skin has turned black or begun to scale off, do not attempt to restore its vitality by friction, but apply a little cotton, after which wrap the part loosely in flannel.

4. In the case of a person apparently dead from exposure to cold, friction should be applied to the body and the lower extremities, and artificial respiration practiced as in cases of the apparently drowned. As soon as the circulation appears to be restored, administer strychnia sulphate one-fortieth grain. Even if no signs of life appear, friction should be kept up for a long period, as instances are on record of recovery after several hours of suspended animation.

SCALP WOUNDS.

Treatment.—Examine the parts carefully; clip and shave the hair from a wide area about the wound; wash with warm water; draw the edges of wound together with the fingers and apply absorbent cotton with adhesive plaster. Stitches of silk ligature may be used. All the precautions given on page 39 as to cleanliness of hands and instruments must be followed. The stitches must not be drawn too tightly, the edges simply brought together. Bleeding is often severe, but usually stops under pressure or after the stitches have been put in and the dressing applied; but if an artery spurts it must first be tied. A few strands of silk ligature may be put in at the most dependent part of the wound for drainage, but this is not usually necessary. No part of the scalp should be removed, no matter how slender its attachment. If replaced it will probably retain its vitality. Dress the wound with a pad of clean (aseptic) gauze and apply a bandage, not tightly.

The stitches should be removed the sixth day. Unconsciousness and bleeding from the ears are grave symptoms, indicating fracture of base of skull or rupture of blood vessels within.

INJURIES TO THE CHEST.

Contusions of the chest and fracture of the ribs are of frequent occurrence, and it is not always easy to determine in a given case of injury to the chest walls whether fracture actually exists, but if in doubt, give the patient the benefit, and treat the case as one of fracture.

Fracture involving several ribs, or one or more ribs at two points each, is not difficult to make out, for in addition to the sharp pain in breathing, and the bloody expectoration which is present in cases where the lung is wounded, there is considerable deformity.

In single fracture of the ribs there is little or no deformity, but the pain in breathing and coughing is apt to be severe. Pressure on the broken bone is also quite painful, and if a hand is placed over the seat of injury, or a finger on either side of the fracture, and the patient requested to cough, a grating may be felt, unless the rib is covered with heavy muscle or fat, when, as before stated, it may be difficult if not impossible to say whether or not fracture exists.

Treatment.—Strips of adhesive plaster, 3 or 4 inches wide and long enough to extend from the spine to the middle or a little beyond the middle of the breastbone, should be applied horizontally from the armpits downward over the whole side of the chest. Each piece to be forcibly applied at the end of expiration (when the lungs are empty) and to overlap the preceding piece to one-half its width.

Any slight outward deformity at the seat of fracture may be reduced by pressure before the plaster is applied at that point. A broad bandage should then be applied around the chest from below upward.

INJURIES TO THE BACK.

Sprains of the back are of all degrees of severity. In slight sprains the muscles alone are involved, and beyond a temporary stiffness, and pain over a limited area, there may be no trouble.

In severe sprains it is difficult to determine the degree of injury. Marked pain and stiffness are always present, and not infrequently paralysis of the legs, bowels, and bladder. Death may be produced by shock, or occur later from secondary effects of the injury.

Treatment.—Rest in bed. Epsom salts to move the bowels; rub the back with soap liniment. Apply a binder or bandage around the body from the hips up over the chest. See that the bladder does not become distended. If necessary, introduce a catheter and draw off the urine. Boil catheter for five minutes before using.

BROKEN BONES (FRACTURES).

There are many varieties of fracture. A fracture is said to be **simple** where there is no open wound directly over the bone injury; **compound** when there is an opening in the skin and soft parts extending down to the broken bone; **comminuted** when the bone is broken in several places; **complicated** when associated with other injuries, as dislocation of the joint or rupture of the main artery of the limb; **impacted** when one fragment is driven into another.

The reliable signs or symptoms of simple fracture are deformity, crepitus (grating) when the ends of the broken bone are rubbed together, unnatural or false point of motion, and, if in the shaft of a long bone, shortening, due to the fact that in most cases the break is obliquely across the bone and the fragments override. But in transverse fracture, where the break is straight across the bone at a right angle with the long axis of the bone, or in a fracture near a joint, there may be no shortening and no deformity. In fractures of certain bones, as the skull or the spine, or in an impacted fracture, there may be no motion. In fracture of the kneepan or the elbow the fragments are pulled apart by the muscles, so there is lengthening instead of shortening.

Examination should always be made as soon as possible after the accident. Under the most favorable circumstances it is difficult in some cases to determine whether a bone is broken or not, and the difficulty is greatly increased if the examination is delayed until inflammatory swelling has set in. In fractures of the extremities the sound limb should always be placed alongside the injured one for

comparison. The shortening in fracture of the thigh may be from 1 to 3 inches, but it must not be forgotten that in some persons there is a natural difference of as much as half an inch in length of the pair of legs; and a limb may be otherwise naturally deformed which should not be mistaken for accidental deformity. In the leg below the knee there are two parallel bones (tibia and fibula). In simple fracture affecting only one of these bones the deformity and crepitus are less marked; and the same may be said of the forearm, if fracture exists in only one of the bones (radius or ulna). If both bones of the leg (tibia and fibula) or of the arm (radius and ulna) are affected, there may be considerable deformity, and it is a curious fact that fracture of these bones seldom occurs on the same level. The distance between the fractures may be from 1 to 3 inches, usually greater in the leg than in the forearm.

Crepitus (the sound heard, or feeling imparted to the hand when the broken ends of the bone are rubbed together) is a valuable symptom of fracture, but it can not always be detected, and when other marked signs or symptoms are present, need not and should not be looked for. In fractures of the leg below the knee or of the forearm, involving only one of the bones, it is hard to make out because of the difficulty of rubbing the broken ends together, and when much swelling exists the difficulty is increased, or a false crepitus may be produced. In impacted fractures, which occur chiefly in the neck of the thigh bone, no effort should be made to obtain crepitus. The important thing in such cases is not to disturb the impacted fragments, for if pulled apart recovery is rendered more difficult.

FRACTURE OF THE LOWER JAW.

Fracture of the lower jaw may be simple, compound, or comminuted. The mucous membrane of the mouth is nearly always lacerated, the bleeding is usually not severe (oozing only), but there may be hemorrhage from an artery (the inferior dental), saliva dribbles from the half-open mouth, the teeth may be out of line, pain is apt to be severe, there may be considerable deformity and a false point of motion.

Treatment.—Restore the parts to the natural position and keep them at perfect rest, first washing out the mouth with hot water to cleanse it and check bleeding. If the bleeding is very severe, pressure should be made by the thumb or finger for a time on the bleeding point if possible, or on the large artery (carotid) on the side of the neck, which may be easily located by the pulsation. Loose teeth or pieces of bone should not as a rule be removed. Mold them into place, bring the teeth and jaw into natural line, and keep them so by a pasteboard or binder's board splint (figs. 2 and 3), held in place by a four-tailed bandage.

Take a piece of pasteboard about 8 or 9 inches long by 4 inches wide and cut it up in the middle from each end to within about an inch or inch and a half from the center, according to the size of the chin. Dip it in hot water and mold it to the chin and jaw. (Fig. 3.) Remove it carefully, line it with absorbent cotton, reapply it, and retain it in place by the four-tailed bandage. (Fig. 4.) The four-tailed bandage may be made in the following manner: Take a bandage or piece of heavy muslin about 3 inches wide and a yard or

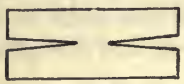

FIG. 2.

FIG. 3.

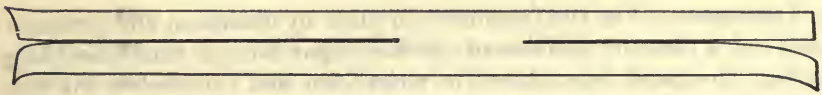

FIG. 4.

FIG. 5.

Fig. 2 shows the pasteboard or leather as cut out; Fig. 3 shows the same molded to fit the chin and jaw; Fig. 4 is a four-tailed bandage; and Fig. 5 shows how they are applied.

a yard and a half long. In the middle of this or a little to one side of the middle cut a slit large enough for the point of the chin; place the narrower portion upward, then tear the bandage down the middle from each end to within 2 inches of the slit, so as to make four ends or tails; then carry the two upper ends backward and tie at the nape of the neck; carry the two lower tails to the top of the head and tie in a knot. (Fig. 5.)[a] The ends of the knots at nape of neck and top of head may then be tied together to hold them in place and prevent

[a] The application of the bandage as directed causes a lapping of the tails, which is not shown in the plate. The object of the lapping is to prevent the tearing of the bandage at the angle and make it much stronger.

slipping. If necessary, a bandage may also be carried around the head and secured with pins.

If the parts can not be kept in place by the methods described, the teeth may be fastened together with silver wire passed between the teeth on each side of the break and twisting the ends together. Feed the patient on liquid food through a rubber tube introduced behind the last tooth or through any space left by the loss of a tooth, the object being to prevent movement of the jaw. Wash out the mouth frequently with hot water, and, if necessary, change the dressing every two or three days until the end of about the sixth or eighth week, when, if all goes well, union will be complete, and the splint and bandage may discontinued.

FRACTURE OF THE THUMB AND FINGERS.

Treatment.—Put the fragments in place by extension and pressure; then cut a piece of pasteboard, leather, cigar box, or thin board long enough to extend from above the wrist joint to a little below the ends of the fingers and a little wider than the hand. Cover the board with lint or any soft cloth, place the palm of the hand flat upon it, and apply a bandage around the whole hand and wrist.

If pasteboard or leather be used, it may first be dipped into hot water and then molded to the shape of the thumb or finger and palm of the hand, then lined or covered with cloth, and bandaged as above, care being taken not to make the bandage too tight.

FRACTURE OF THE FOREARM.

The forearm extends from the wrist to the elbow. When both bones are broken there is apt to be marked displacement and crepitus (grating felt by rubbing the broken ends of the bone together). When only one bone is broken the signs and symptoms are not so clear, but by careful examination the nature of the injury may be determined. When fracture of one of the bones (the radius) occurs near the wrist joint (Colles' fracture) there is generally marked deformity resembling a silver fork in shape.

Treatment.—Prepare two splints of thin board or heavy binder's board, one for the palmar side of the forearm long enough to extend from the elbow to the palm of the hand. The other for the back of the forearm may be a little shorter, but should extend from the elbow to below the wrist back of the hand. Both splints must be a little wider than the arm so as to prevent the bones from being drawn together by the bandage. Line the splints with several layers of lint or with absorbent cotton or soft cloth. If deformity exists, reduce it by extension and counter extension. Pull on the hand while an assistant holds or pulls at the elbow, and gently press the projecting fragment to its normal position. Place the arm between the splints in such a

way that when bent at an angle the thumb will point directly upward and the palm of the hand lie flat against the chest. Apply a roller bandage outside and around the splints from fingers to elbow, being careful not to make it too tight, and hang the forearm in a broad sling.

Another way to hold the splints in place is to apply strips of adhesive plaster around them, one at the upper and the other at the lower end. If swelling occurs, the bandage must be loosened. The splints should be worn six weeks or two months, and passive motion—that is, gently bending and straightening of the fingers with the other hand—must be made every few days to prevent stiffening.

FRACTURE OF THE ARM (BETWEEN THE ELBOW AND SHOULDER).

Treatment.—Splints of binder's board dipped in water and molded to the part or any thin board will answer the purpose if properly lined or padded. Place one splint on the outside of the arm extending from the elbow to the shoulder (fig. 6), an internal angular splint extending from the armpit to the fingers on the inner side (fig. 7), and if need be a narrower splint in front and one behind, and the whole surrounded with a well-fitted bandage. Support the forearm by a sling, but leave the elbow free. (Fig. 8.)

If much swelling occurs, all bandages must be loosened.

The splint should be worn about eight weeks. Under the most favorable circumstances, after fracture, this bone (the humerus) sometimes fails to unite. At least once a week the joints should be moved to prevent stiffness.

Fractures of the arm (of the humerus) at or near the elbow joint or shoulder joint are frequently very difficult to make out, even by the most skillful surgeon, especially if some time has elapsed since the injury was received; and the treatment of necessity is equally difficult.

If near or at the elbow joint, and if there is much pain, heat, and swelling, as is apt to be the case, cold applications should be applied, and the arm laid upon a pillow until the swelling has gone down. A rectangular splint of binder's board or leather should then be dipped in hot water and applied to the inner side of the arm and forearm. The splint should be wide enough to extend nearly halfway around the arm. It must be well padded and held in place by a roller bandage, and the forearm supported by a sling.

Fracture of the humerus near the shoulder joint may be treated by means of a shoulder cap of thick pasteboard molded to fit the shoulder and extending nearly to the elbow, or a splint on the outer side of the arm, and a pad of folded lint or of absorbent cotton under the arm (in the armpit). The shoulder cap or splint should be padded

the same as in any other fracture and the whole surrounded by a roller bandage which encircles the chest, binding the arm to the chest. If the deformity is marked, a second and shorter splint may be placed on the inner side of the arm, taking care that the upper end does

Fig. 6.

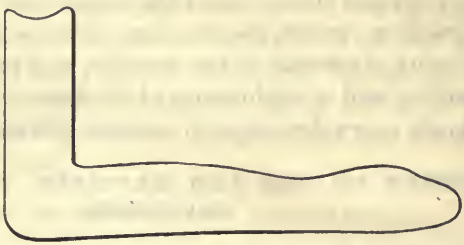

Fig. 7.

Fig. 8.

Fig. 6 is the outside splint to extend from shoulder to elbow; Fig. 7 is the internal angular splint to be placed between the arm and the body; and Fig. 8 shows the two splints applied with a bandage around them and the arm from the fingers to the shoulder, with a sling properly arranged to support the forearm but not to raise the elbow.

not press too hard into the armpit. The arm should then be bound to the chest by a board bandage.

After the application of any apparatus for fracture of the arm or forearm, the circulation should be carefully watched by feeling the pulse at the wrist. If it can not be felt, or if the fingers swell, the bandages should be removed and reapplied less tightly.

FRACTURE OF THE THIGH.

The thigh bone (femur) extends from the hip to the knee. Fracture of this bone may occur in any portion of the shaft, but the most common seat of fracture is about the middle or the middle third. Fractures high up near the hip joint are frequently very difficult to make out, and the results of treatment in such cases, even under the care of skillful surgeons, are not always satisfactory.

In fracture of the middle or middle third of the bone, the deformity is usually produced by the lower fragment (the broken end of the lower portion of the bone) being drawn up behind and to the inner side of the upper fragment; the weight of the limb then causes rotation and the foot and toes are turned outward.

If the fracture is a little higher up, displacement is shown by the upper fragment, which, by the action of the muscles, is thrown strongly forward and outward. In either case there are complete **loss of power, shortening** to the extent of 1 to 2 or 3 inches, pain on the slightest movement, **crepitus** (grating) if the broken ends of the bone are rubbed together, and abnormal motion.

In impacted fractures, which are met chiefly at or near the hip joint, the shortening may be, and usually is, less marked. Loss of power is usually complete, but not always. Patients have been known to stand and even walk a few steps. Injuries of this kind require the greatest care; the limbs should be handled very carefully. If on slight traction or manipulation crepitus is not felt, no further attempt should be made to obtain this symptom, for in doing so the impacted bones may be pulled apart, which is to be avoided unless especially directed by a skillful surgeon.

Treatment.—In the absence of a physician, about all that may reasonably be expected to be done in impacted fracture is to apply a broad bandage around the hips and place the patient in a good bed on a firm mattress and make lateral support by means of sand bags, one on the outside long enough to reach from the upper end of the hip bone to the foot, the other along the inner side of the leg from the crotch to the foot. Fill the bags three-quarters full of dry sand. Keep the leg straight, toes upward.

Treatment of nonimpacted fracture of the thigh bone at or near the hip joint.—Place both legs on the double-inclined plane, or make extension and fix the limb in the straight position by means of a long splint (a splint extending from the armpit to the foot), or by the weight and pulley, or by the long splint and the weight and pulley combined, in the manner now about to be explained in connection with the

Treatment of fractures of the shaft of the thigh bone.—In fracture of the shaft of this bone the signs and symptoms, as already

stated, are usually well marked. If the fracture is at the upper end or in the upper third of the bone, especially if the upper fragment is tilted forward, the double-inclined plane (fig. 9) well padded or covered with pillows, with weight and pulley attached by means of adhesive plaster stuck to each side of the thigh as far as the knee,

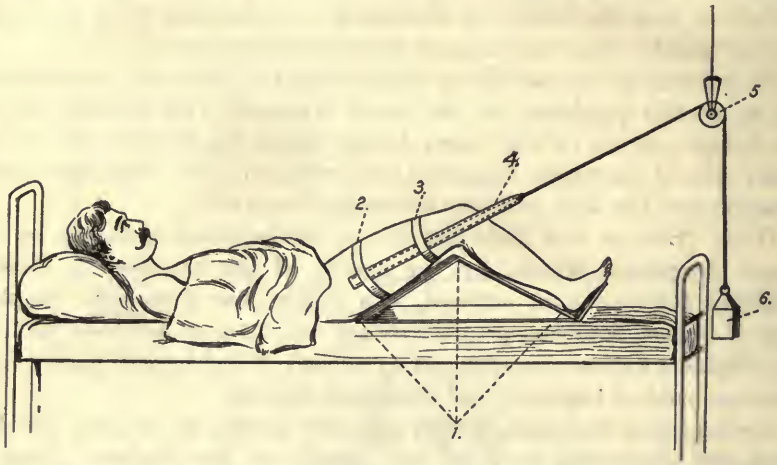

FIG. 9.—Shows a double-inclined plane with the weight and pulley—1 is the double-inclined plane, 2 and 3 are circular pieces of adhesive plaster to prevent 4, the longitudinal strip on each side of the thigh, from slipping; 5 and 6 are the pulley and weight.

affords the easiest and probably the best means of treatment. But in the majority of cases when the fracture is farther down, about the middle or in the middle third of the bone, the weight and pulley with the leg and thigh in a straight line (fig. 10), or the weight and pulley and long splint combined (fig. 11) are better adapted if properly applied. Sand bags may also be used in connection with any of the

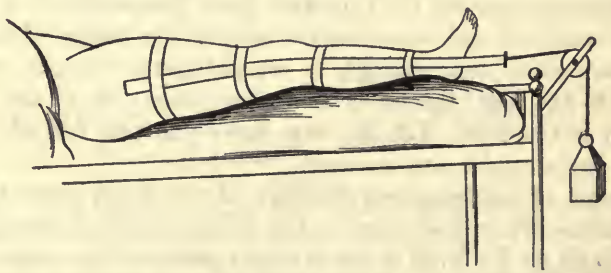

FIG. 10.—Shows the weight and pulley applied with the leg and thigh in the straight position—the adhesive strips being attached to the leg as well as the thigh.

straight splints placed alongside. In all cases the fracture should be reduced by gradually pulling and carefully pressing the broken bones into their natural position. In addition to the splints already mentioned, short splints of narrow strips of thin board or binder's board should be applied directly over the seat of fracture.

If a double-inclined plane is not at hand, two broad pieces of board may be nailed together at a suitable angle and used instead, always properly padded or covered with pillows.

The weight and pulley (figs. 10 and 12).—The weight and pulley are applied as follows: Measure the distance from 1 inch below the crotch to a point 4 inches below the foot. Cut a strip of adhesive plaster exactly twice as long as the distance just measured and 3

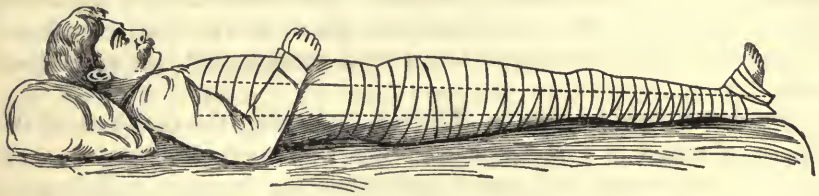

FIG. 11.—Shows the long lateral splint extending from the armpit to a point a little below the foot. It is bandaged to the body and the lower extremity, and may be used with the weight and pulley.

inches wide, and stretch it on a table or on the floor, with the sticky side up. Get a block of wood 4 inches long, about 3 inches wide, and about ½ inch thick, with a hole bored through the center large enough to admit a large cord. Place the block exactly in the center of the long strip of adhesive plaster. Cut another strip of plaster the width of the first and 18 inches long, and place it on the first strip, sticky surfaces together, so as to include the block

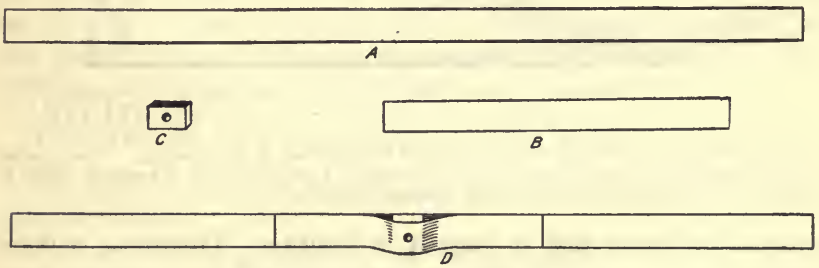

FIG. 12.

A shows the long strip of adhesive plaster; *B* shows the short strip. *C* is the block of wood 4 x 3 x ½ inches with a hole in the center. *D* shows the block placed between the two strips of plaster, all ready for application to the leg or thigh.

between the center of each. Thus a stirrup is made and the plaster kept from sticking to the ankle bones, because it would make them sore. The long strip of plaster on each side of the stirrup is then applied to the leg and thigh after shaving on each side the surface to which it is to be applied, extending from a point just above the ankle bone to a point about 1 inch below the crotch on the inner side and to the same level on the outer side, being careful to keep the

block square when the two ends of the plaster are stuck to the limb. A roller bandage is then applied over the plaster from the ankle up. A strong cord is then passed through the hole in the block and knotted so that it can not slip through, the other end being passed over a pulley attached to the foot of the bed or elsewhere, as may be convenient, on a line with the extended limb, and a weight of from 5 to 30 pounds, as may be necessary or comfortable to the patient, gradually increased, attached. The same kind of apparatus may be used with the double-inclined plane, except that the plaster is applied only to the thigh, the stirrup coming just below the bent knee.

Counter extension may be obtained by raising the foot end of the bed on blocks 4 to 6 inches high. The short splints should be well padded and extend well above and below the fracture, and be held in place by strips of plaster or bandage.

The long splint gives additional support and prevents outward rotation of the leg. It should be well padded, and have a cross-

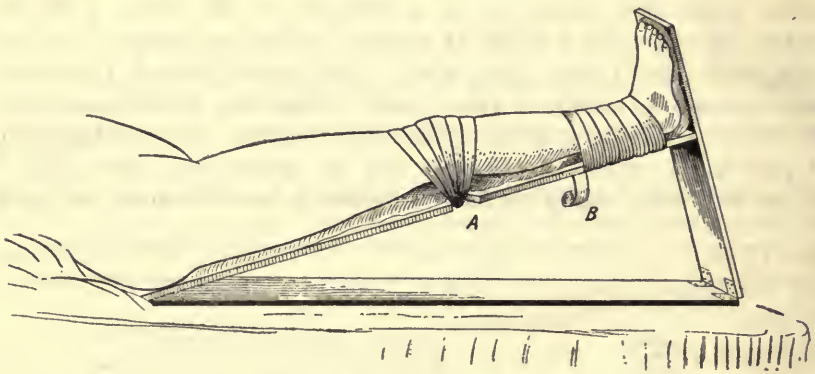

FIG. 13.—Shows a splint and bandage applied for fracture of the kneecap. *A* is a notch in the board to prevent slipping of the bandage. *B* is the end of a bandage which is to be carried above the knee over the bandage shown at *A*.

piece at the lower end to keep it in position. Treatment will be required for a period of eight to ten weeks, but the extension may be lessened about the end of the sixth week and passive motion made at the knee joint.

FRACTURE OF THE KNEECAP.

Fracture of the kneecap may be transverse, vertical, or oblique. The bone may be broken into two or more irregularly shaped pieces.

Symptoms and signs.—Loss of power, inability to extend the joint or raise the limb from the bed. In the transverse variety the fragments are widely **separated.** If seen soon after the accident, the line of fracture—the gap between the fragments—may be seen and felt. **Swelling** rapidly appears and the signs are obscured.

Treatment.—Various forms of apparatus are employed, and in hospital practice the injury is frequently treated by surgical operation, with good result. The simplest form of treatment is to place the limb on a long posterior splint (fig. 13) with the foot raised so as to relax the thigh muscles, or if the patient is propped up in bed by pillows or a back rest, the limb may be allowed to lie on a level.

Apply iced water or the ice bag for a few days, until the swelling and heat have subsided; then remove the splint and apply a roller bandage. The turns of the bandage below and above the knee should be made in an oblique direction, figure-of-eight fashion, so as to press and hold the fragments of bone together, the indications being, as in other fractures, to restore the broken ends of the bone to their natural position and keep them there. A pad of cotton should be placed in the hollow back of the knee and another smaller pad on the front of the thigh above the upper fragment before the bandage is applied. The splint should then be relined with layers of dry cotton or folds of lint and the limb placed upon it as before, secured by another roller bandage. If swelling or numbness of the foot is complained of, the bandage is too tight **and must be removed.**

If the bandages become loose, as they are apt to do every few days, they should be reapplied.

The long splint should be worn about six weeks or two months, when it may be replaced by a shorter molded splint of leather, felt, or pasteboard to prevent motion at the joint when the patient may be allowed to walk with canes or crutches. The short splint should be worn for at least a month, and then a suitably constructed knee-cap should be worn for one year to support the joint. More or less stiffness of the joint is to be expected.

FRACTURE OF THE LEG (BETWEEN THE KNEE AND ANKLE).

The leg extends from the knee to the ankle and has two bones, tibia and fibula.

Fracture of the leg may be simple or compound. Both bones may be broken or only one; the line of fracture may be oblique or transverse. When both bones are broken at the middle or lower third the deformity is usually quite marked. The break is apt to be in an oblique direction and at a lower level in the tibia (the shin) than in the fibula. In simple fracture of the upper part of the leg the deformity may be less marked, but if the knee is involved there may be great swelling because of acute and serious inflammation of the joint.

When the shaft of only one bone (the tibia or fibula) is broken there is not much displacement, because in such case the sound bone acts as a side splint. Fracture at the lower end of the tibia at the

projection on inner side of ankle is sometimes mistaken for sprained ankle, and if the small fragment of bone is not accurately adjusted and kept in proper position the result may be a weak and stiff joint.

The fibula may be fractured at any point, but the important fracture of this bone is known as "Pott's fracture." (Fig. 14.) This fracture occurs about 3 inches above the ankle, on outer side of the leg, and is accompanied or complicated by outward dislocation of the foot, and not infrequently by the breaking or tearing off of the tip of the lower end of the tibia.

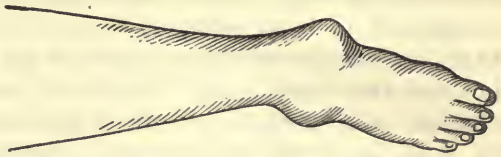

FIG. 14.—Shows the appearance of the right foot after a "Pott's fracture."

Treatment.—If the line of fracture is oblique, the limb must be handled very carefully so as to prevent injury to the soft parts by the sharp ends of the bone and thus avoid the conversion of a simple fracture into a compound one.

A Pott's fracture should be treated as follows: Take a board splint long enough to extend from the knee to a few inches beyond the sole of the foot. Pad the splint well, having the lower end of the padding at least 2 inches thick, and do not let it extend quite to the ankle joint below. Apply the splint to the inner side of the leg so that the foot and ankle project below the padding. The foot and leg are

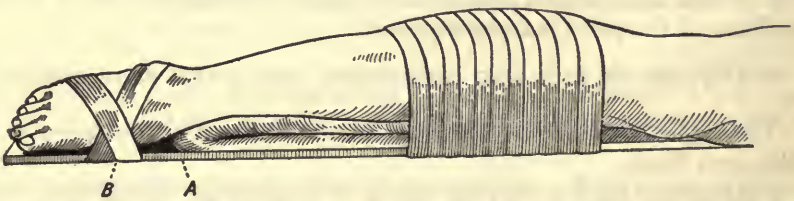

FIG. 15.—Shows the splint applied for a "Pott's fracture." *A* shows the thick padding (3 inches) ending just above the ankle. The bandage *B* keeps the foot turned in and prevents the tendency to outward displacement.

then bandaged to the splint in such a way as to turn the foot inward and thus correct the outward displacement. (Fig. 15.)

In all ordinary cases of simple fracture of the leg, unless a physician is present, probably nothing better can be done than to place the leg in a fracture box (fig. 16) containing a soft pillow, and if necessary an extra pad of cotton for the heel. The side pieces of the fracture box are fastened each by two hinges to the backboard so as to be easily opened or closed. A pillow is placed on the backboard and after the fracture is reduced, by extension and counter

extension, the leg is carefully placed upon the pillow and the sides of the box are closed or drawn together closely enough to make easy and equable support to the broken bones. Two or three holes should be bored in the upper edge of the sideboards so that they may be tied together, or strips of bandage may be tied around the box. Two mortise holes should be made in the footboard for the reception of strips of adhesive plaster, so that in addition to the fracture box the weight and pulley may be applied to overcome any shortening or deformity. Another good plan is to line the backboard (the bottom of the box) with a layer of cotton or folds of lint and then fill in and surround the leg with bran.

In the absence of any of the apparatus mentioned, three well-padded splints may be applied—one on each side and one on the back of the leg. But if there is any displacement or overriding the fracture must be reduced and held in proper position while the splints are being applied.

Whatever form of appliance is adopted, care must be taken that the foot is at a right angle with the leg, the toes pointing directly upward.

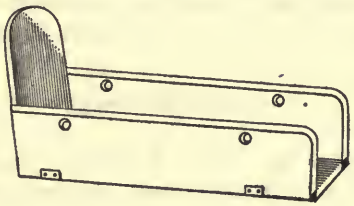

FIG. 16.

The inner side of the kneecap, the projection on the inner side of the ankle, and the inner side of the big toe should be on the same line.

In the hospital or where the patient is under the care of a surgeon a fixed dressing of plaster of Paris or silicate of soda may be used to the greatest advantage after the first week, or, in some cases, from the very beginning of treatment.

COMPOUND FRACTURES.

Compound fractures are serious accidents and require prompt attention. The general principles of treatment so far as the bone is concerned (place it in normal position and keep it there) are the same as for simple fracture. But to do this and at the same time give proper attention to the wound in the soft parts (the open wound extending down to the bone) frequently demands the highest surgical skill.

Shock from loss of blood is the immediate danger. Inflammation, erysipelas, blood poisoning, or lockjaw may set in later, and still later the patient may become exhausted from long-continued suppuration.

Treatment.—If the wound is very small, it should be well cleaned with hot water (water that has been raised to the boiling point and allowed to cool down to about 120° F.) or by antiseptic solution (solution bichloride of mercury 1 to 5,000), then covered with aseptic gauze, and the case treated as a simple fracture. (Clean hands as indicated on page 39.)

In nearly all cases, however, the safest and best plan is to leave the wound uncovered by splint or bandage, so that light dressings may be easily applied and frequently changed. The wound should be thoroughly cleansed with hot water and antiseptic solution, and, after reducing the fracture, the splints or extending apparatus should be so arranged that the wound is freely accessible and easily drained. Strips of aseptic gauze should be placed in the wound and gently carried down to the bottom by means of a probe, and a larger piece of aseptic gauze in loose folds should be laid over the wound.

The aseptic-gauze dressing should be renewed every day or every second day or as often as necessary to keep the wound well drained until it heals from the bottom.

In severe cases amputation may be necessary to save life, and in all cases the patient should be placed under the care of a surgeon as soon as possible.

DISLOCATIONS.

A bone is dislocated or "out of joint" when it is displaced or forcibly separated from another bone entering into the composition of a joint.

Dislocations may be complete or incomplete. A dislocation is **complete** when the articular surfaces are entirely separated and the ligaments torn, as in dislocation of the hip joint; **incomplete** when the articular surfaces are not entirely displaced. Dislocations may be **simple, compound,** or **complicated.**

A dislocation is **simple** when there is no wound of the skin and soft parts—when the articular surfaces are not exposed to the outer air; **compound** when there is an open wound and the outer air is brought into contact with the articular surfaces of the joint; **complicated** when besides the dislocation there is a fracture and serious damage to the soft parts, or to blood vessels or nerves.

Dislocations are said to be most common in adult or middle life, when the bones are strong and the muscles powerful. In the young and old the bones are more apt to break. There are, however, striking exceptions to this rule when applied to the elbow joint and the shoulder joint. The elbow joint in young subjects is frequently dislocated; and dislocation of the shoulder joint in old men is not uncommon.

Symptoms and signs of dislocations.—Deformity is always present and may be determined by comparing the injured side with the sound one. The head or end of the bone is in an abnormal position; the attitude of the limb is changed; the patient can not move the limb; and when effort is made to move the joint it is found to very stiff. There may be shortening or lengthening. For example, in dislocation of the hip the head of the thigh bone may be thrown outward and upward, when there will be shortening of the leg; or it may be forced downward and inward, when the length of the limb will be increased.

Treatment.—The indications are to replace the bones in their natural position and to keep the parts at rest until the ligaments and damaged tissues about the joint are healed. A dislocation should be reduced immediately after the accident whilst the patient is faint and the muscles are in a relaxed condition.

Having thus briefly described a dislocation and the treatment indicated, the question now arises, How shall the treatment be applied, how shall the dislocation be reduced? And when it is taken into consideration that the reduction of dislocations not infrequently taxes the skill of the most experienced surgeon (even with the aid of general anesthetics), it is hardly to be expected that a nonprofessional man will be able to accomplish the desired results in many cases. It must also be borne in mind that there are certain dangers attending efforts at reduction, especially at the larger joints, if improperly or too forcibly applied—such as fraction of bone or rupture of blood vessel.

DISLOCATION OF THE FINGERS.

Dislocation of the bones of the fingers may be backward or forward.

Treatment.—Extension and counter extension and manipulation. Pull the finger directly in line with the hand, and when fully extended make pressure on the head of the bone. Reduction is usually effected without much difficulty. Place the finger on a well-padded splint for one week, then make passive motion, and, if necessary, the splint may be worn for another week.

DISLOCATION OF THE THUMB.

Dislocation of the thumb may be backward or forward.

Treatment.—The treatment is not the same as for dislocation of the fingers, and reduction, especially of the backward dislocation, is usually very difficult. Try by pushing the end of the thumb upward and backward until it stands perpendicularly on the bone from which it is dislocated, then make strong pressure against the base of the dislocated bone from behind forward, sliding it on the bone beneath till it gets to the end, then flex or bend the thumb into place.

DISLOCATION OF THE WRIST.

Dislocation of the wrist joint may be backward or forward. It is a rare injury. Fracture about the wrist is more common, and is sometimes mistaken for dislocation. A stiff joint is apt to be the result.

Treatment.—Extension, counter extension, and direct pressure. Grasp the hand of the patient, pull in a straight line, and have an assistant pull on the forearm in the opposite direction, and when the parts are fully extended make direct pressure upon the wrist bones. Apply a bandage, and place the hand and forearm on a well-padded splint for a week; then remove the splint and make passive motion at the joint; reapply the splint and remove it after an interval of another week. If there is much pain or swelling after reduction of the dislocation, apply cold water.

DISLOCATION OF THE ELBOW.

Dislocations of the elbow are serious accidents. They present a variety of forms, **backward, forward, outward,** and **inward,** and these are divided into a number of subvarieties. One or both bones may be involved, and the dislocation may be associated with fracture. Reduction in some cases is comparatively easy, in others it is very difficult, even in the hands of experienced surgeons.

Without a thorough knowledge of the anatomy of the normal joint it is very difficult to understand the different forms of dislocation, and of necessity equally difficult to apply the proper treatment.

Immediately after the accident and before swelling sets in the injured elbow should be carefully compared with the sound one. When the normal arm is extended (straight) the tip of the elbow and the bony points on either side should be in a transverse line across the joint. If these prominences are found out of line, dislocation or fracture is probably present.

Treatment.—Fixation of the arm above the elbow, extension or flexion of the forearm, and direct pressure by means of the thumbs or fingers on the head of the dislocated bone, so as to push it back into the socket. After reduction an angular splint should be applied to inner side of arm (fig. 7), lightly bandaged, and the forearm carried in a sling. Cold water may be applied to reduce inflammatory action. Passive motion should be employed at the end of a week.

DISLOCATION OF THE SHOULDER.

[After Helfrich.]

Dislocation of the shoulder joint is a very common accident. It occurs as frequently as all other dislocations put together. The frequency is explained by the great latitude of motion of the joint, the

shallowness of the socket, and the size and rounded shape of the head of the bone, the laxity of the capsular ligament, and the leverage exerted on the joint by the long bone.

There are three chief forms of dislocation of the shoulder—(1) forward and downward below the collar bone, (2) directly downward into the armpit, and (3) backward on the shoulder blade.

The symptoms and signs are **pain, swelling, rigidity** (stiffness), **loss of power, flattening** and **angular appearance** of the shoulder as compared with the other shoulder, abnormal situation of the head of the bones, and **change** in the **axis** of the long bone. (Fig. 17.) In

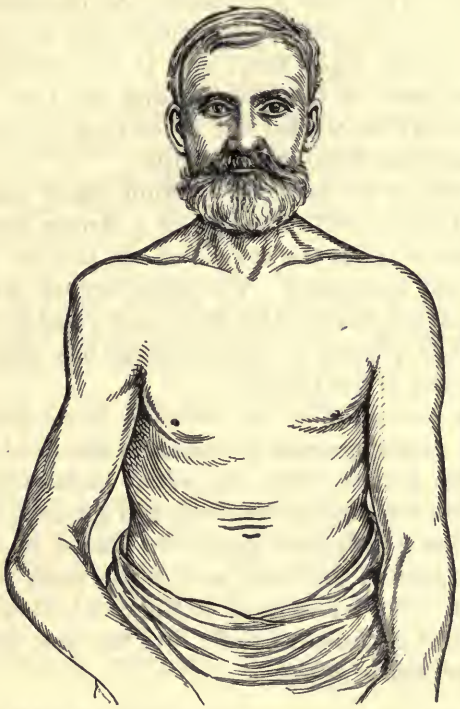

FIG. 17.—Dislocation of the right shoulder.

the first variety, the most common of all, the head of the bone may be felt in front of the armpit and below the collar bone, and the elbow points outward and backward. In the second the head of the bone may be felt in the armpit, and the elbow points outward. In the third the head of the bone may be felt on the back of the shoulder blade, the elbow points forward, and the forearm is thrown across the chest. Another valuable sign is that when the elbow is placed on the chest the patient can not place the hand of the injured side upon the opposite shoulder, or if the hand is placed on the shoulder the elbow can not be brought into contact with the chest.

Treatment.—The treatment for the first variety (forward and downward) is as follows: Lay the patient down or let him sit on a chair; bend the forearm on the arm; press the elbow against the side of the chest and hold it there; rotate the arm outward by carrying the forearm outward; pull steadily on the arm and rotate inward by carrying the elbow upward and forward with forearm across the chest. While this is going on have an assistant place his hand in the armpit and press the head of the bone into place.

For the second variety (directly downward into the armpit) place the patient on his back; remove your boot; place your heel in the armpit; grasp the wrist and pull steadily on the arm. If the dislocation is in the right shoulder, seat yourself on the right side of the patient and use your right foot; and if the injury is in the left shoulder seat yourself on the left side and use your left foot. The same principles may be carried out by seating the patient on a low chair and placing your knee in the armpit.

Another method is to have an assistant stand upon a table and make counter extension with a towel, or a strong piece of soft cloth of any kind, passed under the armpit of the patient, while the operator pulls the arm downward. The same method may be employed by causing the patient to lie on his back, and an additional advantage may be obtained by placing a rolled bandage or a pad of any kind in the folds of a towel in the armpit.

In dislocation backward on the shoulder blade, pull the arm forward and make direct pressure forward on the head of the bone, or stand behind the patient, draw the elbow backward, and with the thumb press upon the head of the bone and guide it into place.

After reduction a soft pad should be placed in the armpit, the upper arm bandaged to the body, and the forearm placed in a sling across the chest. Passive motion at the joint should begin at the end of a week and be repeated daily, but the arm should be carried in the sling about three weeks.

DISLOCATION OF THE COLLAR BONE.

The collar bone extends from the upper border of the breast bone to the highest point of the shoulder blade. Dislocation may occur at either end. Reduction is comparatively easy, but it is difficult to retain the bone in position.

Treatment.—Make extension by drawing back the shoulders, the knee, if necessary, being placed between the shoulder blades; push the end of the bone in place and try to keep it there by a firm pad fastened by adhesive plaster and bandage. The best result may be obtained by placing the patient at rest on his back for three weeks.

DISLOCATION OF THE TOES.

Dislocations of the toes are very rare accidents. The treatment is the same as for dislocation of the fingers. Dislocation of the big toe may be treated the same as dislocation of the thumb.

DISLOCATION OF THE ANKLE.

The foot may be dislocated forward, backward, outward, inward, or upward. The dislocation may be complete or incomplete.

The lower ends of the bones of the leg enter into the formation of the ankle joint, the end of the tibia on the inner side and the end of the fibula on the outer side of the joint. Dislocations of the ankle are usually complicated by fracture of the tip of one or both of these bones. When, in addition, the fibula is broken above the ankle, the injury is known as Pott's fracture, already referred to.

Treatment.—Extension, counter extension, and pressure. Flex the leg on the thigh and the thigh at right angle to body; pull steadily on the foot, while an assistant makes counter extension at the thigh, and press the bones in place. Apply cold water and place the foot and leg in a fracture box or apply well-padded molded splints. Binder's board dipped in warm water and molded to the part and lined with thick layers of cotton will answer the purpose. If a Pott's fracture, use the splint shown in figure 15. Make passive motion at the joint at the end of two weeks.

DISLOCATION OF THE KNEE.

Dislocation of the knee may be complete, incomplete, compound, or complicated. The direction of the dislocation may be forward, backward, outward, or inward. The deformity is quite marked. Reduction is not very difficult, but the injury is a serious one and care must be taken in making reduction not to produce additional damage by too forcible extension. Fortunately the injury is exceedingly rare.

Treatment.—Extension, counterextension, and pressure. Have one assistant pull steadily, not too hard, on the leg or ankle, while another fixes or pulls on the thigh and presses the bone into place. After reduction apply cold water, and place the leg in a posterior straight splint, well padded, especially below the hollow of the knee, and make passive motion at the end of two weeks. When the patient begins to walk, a kneecap or flannel bandage should be applied.

DISLOCATION OF THE HIP.

Dislocation of the hip joint is a serious injury. It occurs much less frequently than dislocation of the shoulder joint. The socket of the hip joint is very deep, and the ligaments and muscles surrounding the

joint are very strong and powerful. Dislocation occurs only when the limb is in a certain position, when its axis is changed from that of the body, and when in consequence of any sudden or great force received on the lower end of the leg or knee the head of the bone is forced through the ligament (the capsule) which surrounds the joints. The head of the bone may then be thrown (1) backward and upward, (2) backward, (3) forward and downward, (4) forward. The different directions indicate the different forms of dislocation. The first is the most common.

In the first form examination from below up shows the big toe turned toward or resting on the instep of the opposite foot; the knee flexed and resting against thigh at upper margin of opposite knee-

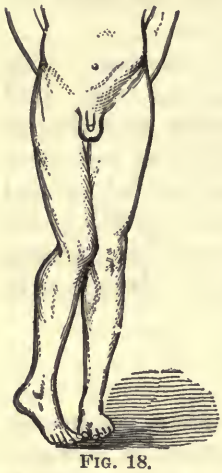

FIG. 18.

FIG. 19.

Fig. 18 shows a backward dislocation of the hip with the knee and toe turned in and the heel raised and the limb shortened. Fig. 19 shows a forward and downward dislocation of the right hip with the knee and toe turned out and the limb lengthened.

cap; the thigh rotated inward and drawn toward its fellow; bulging of the hip; and about 2 inches shortening of the entire limb.

In the second form the signs are the same as in the first, but less marked. (Fig. 18.) Fracture of the neck of the thigh bone is sometimes mistaken for this injury. But in fracture there is abnormal motion, and the foot is turned outward.

In the third form (fig. 19) the signs are almost exactly the reverse of the first form. The foot and knee are turned outward, the hip is flattened, and the entire limb is lengthened.

The signs of the fourth form are nearly the same as those of the third, except that the entire limb is shortened.

Treatment.—The treatment is by manipulation, or by extension and counterextension.

For the first and second forms of dislocation, above-described treatment may be applied as follows: Place the patient on his back on a mattress on the floor. Seize the foot or ankle with one hand and place the other hand under the knee. Flex the leg upon the back of the thigh, and the thigh upon the body to about a right angle; then carry the knee inward and rotate it inward on its own axis, then suddenly raise it (lift it toward the ceiling) so that the head of the bone may be thrown over the rim of the socket, and immediately extend the limb with outward rotation to its normal position so that the head of the bone may return to the socket through the hole in the capsule by which it escaped.

The treatment of the third and fourth forms of injury corresponds to that for the first and second, except that the limb should be carried outward first, then inward, across the median line, and rotated inward on its own axis, and then suddenly lifted and brought down to its normal position by the side of its fellow.

No great force should be used in making these movements. If any considerable resistance is met with in rotating or lifting the bone the movement should be modified in such a way that the head of the bone may follow the path of least resistance.

If extension and counterextension be applied they should follow the line of the axis of the dislocated thigh. It must not be forgotten in the consideration of these methods that the application of too much force or of force improperly applied may produce fracture of the bone.

SPRAINS.

A sprain is a stretching or wrenching of a joint. The joints most frequently affected are the ankle, wrist, knee, and shoulder.

The symptoms and signs are pain, swelling, impairment or loss of motion, and discoloration from effusion of blood. When there is much swelling it may be difficult to determine whether sprain or fracture, or both, are present.

Treatment.—If seen at once, before there is much swelling, a bandage should be applied from the toes to 2 or 3 inches above the ankle, and the joint should be kept at perfect rest in an elevated position. If much swelling has already taken place, apply cold applications continuously for several hours. If the symptoms do not rapidly subside, apply hot applications—cloths or towels wrung out of hot water and frequently changed. After the swelling has gone down a bandage properly applied will afford considerable benefit. (Fig. 20.)

The joint must not be kept too long at rest. Passive motion should be performed as soon as the inflammatory symptoms have subsided.

NOSEBLEED.

If bleeding of the nose occur in a full-blooded person, especially if such person is subject to dizziness, we should not be in too much of a hurry to stop it. But if the bleeding is the result of injury or if it occur in a person suffering from disease of the heart or lungs or from the effects of malarial fever, scurvy, or any disease of the general system, effort should be made to stop it.

Treatment.—Remove all pressure of clothing from neck and chest. Caution patient not to blow his nose. If too weak to stand, place him on his back with his arms raised and his head on a high pillow. Bathe the nose in cold water, apply cold water to back of neck or an ice bag to the forehead. Pack the nostrils with pellets of absorbent cotton. The bleeding is sometimes brought under control by the application of hot water to the nostrils.

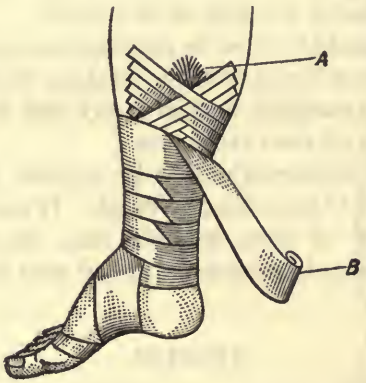

FIG. 20.—Shows the application of adhesive plaster to an ulcer of the leg at *A* and of an ordinary bandage from the foot up the leg, *B*.

In very severe cases the posterior as well as the anterior nares should be plugged. In the absence of a physician the application of this method may be attended with some difficulties. But if the master or keeper decides to try it he may proceed as follows: Pass a fine string twine, about 20 inches long, through the eye of a hard rubber catheter, and thus armed pass the catheter along the floor of the nose to the back of the mouth below the soft palate; introduce a forceps into the mouth back to the end of the catheter, seize the twine, and bring it out of the mouth. Then tie a wad of absorbent cotton or lint to the twine about 12 inches from the end of it; then pull on the catheter and the other end of the twine and draw the wad into the mouth, guided by the finger, behind the soft palate into the posterior nares. He will then have the posterior nares plugged, and one end of the twine hanging out at the mouth and the other end at the nose.

Secure the ends of the twine by tying them together, and allow the plug to remain about two days.

The wad of cotton or lint should be about an inch long and half an inch wide.

DIRECTIONS FOR RESTORING THE APPARENTLY DROWNED.

[As practiced in the United States Life-Saving Service.]

Rule I.—Arouse the patient.—Do not move the patient unless in danger of freezing; instantly expose the face to the air, toward the wind if there be any; wipe dry the mouth and nostrils; rip the clothing so as to expose the chest and waist; give two or three quick, smarting slaps on the chest with the open hand.

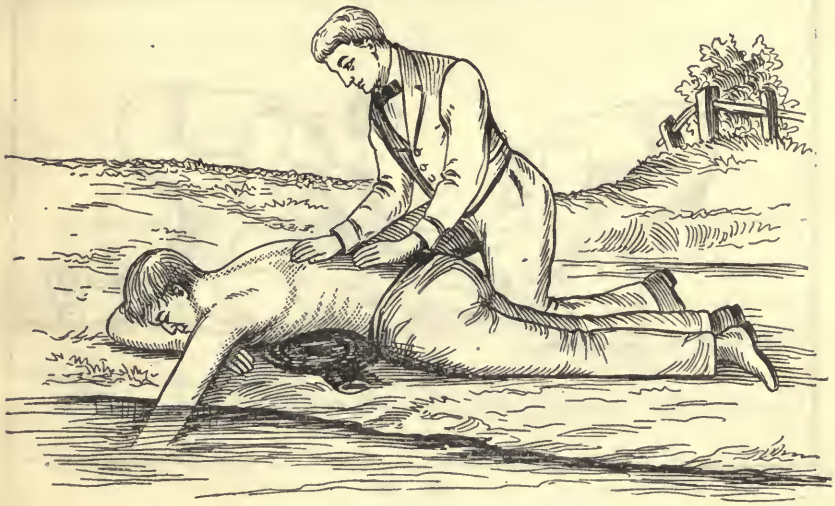

FIG. 21.

If the patient does not revive, proceed immediately as follows:

Rule II.—To expel water from the stomach and chest (see fig. 21).—Separate the jaws and keep them apart by placing between the teeth a cork or small bit of wood; turn the patient on his face, a large bundle of tightly rolled clothing being placed beneath the stomach; press heavily on the back over it for half a minute, or as long as fluids flow freely from the mouth.

Rule III.—To produce breathing (see figs. 22 and 23).—Clear the mouth and throat of mucus by introducing into the throat the corner of a handkerchief wrapped closely around the forefinger; turn the patient on the back, the roll of clothing being so placed as to raise the pit of the stomach above the level of the rest of the body. Let an assistant with a handkerchief or piece of dry cloth draw the tip of the tongue out of one corner of the mouth (which prevents the tongue

from falling back and choking the entrance to the windpipe), and keep it projecting a little beyond the lips. Let another assistant grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting (which enlarges the capacity of the chest and induces inspiration). (Fig. 22.) While this is being done let a third assistant take position astride the patient's hips with his elbows resting upon his own knees, his hands extended ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of the body, the assistant holding the tongue changing hands if necessary[1] to let the arms pass. Just before the patient's hands

FIG. 22.

reach the ground the man astride the body will grasp the body with his hands, the balls of the thumb resting on either side of the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will at the moment the patient's hands touch the ground throw (not too suddenly) all his weight forward on his hands, and at the same time squeeze the waist between them, as if he wished to force anything in the chest upward out of the mouth; he will deepen the pressure while he slowly counts, one, two, three, four (about five seconds), then suddenly let go with a final push, which will spring him back to his first position.[2] This completes expiration. (Fig. 23.)

At the instant of his letting go, the man at the patient's head will again draw the arms steadily upward to the sides of the patient's

[1] Changing hands will be found unnecessary after some practice; the tongue, however, must not be released.

[2] A child or very delicate patient must, of course, be more gently handled.

head as before (the assistant holding the tongue again changing hands to let the arms pass if necessary), holding them there while he slowly counts one, two, three, four (about five seconds).

Repeat these movements deliberately and perseveringly twelve to fifteen times in every minute—thus imitating the natural motions of breathing.

If natural breathing be not restored after a trial of the bellows movement for the space of about four minutes, then turn the patient a second time on the stomach, as directed in Rule II, rolling the body in the opposite direction from that in which it was first turned, for the purpose of freeing the air passage from any remaining water. Continue the artificial respiration from one to four hours, or until the patient breathes, according to Rule III; and for a while, after the

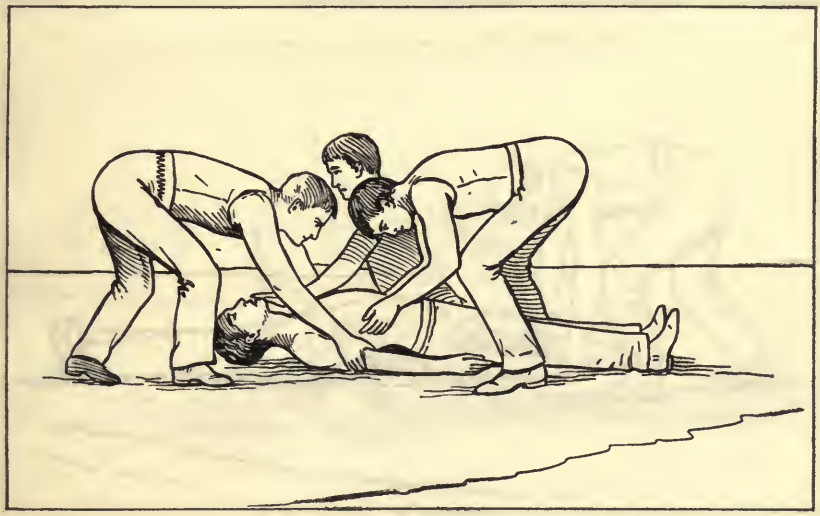

FIG. 23.

appearance of returning life, carefully aid the first short gasps until deepened into full breaths. Continue the drying and rubbing, which should have been unceasingly practiced from the beginning by assistants, taking care not to interfere with the means employed to produce breathing. Thus the limbs of the patient should be rubbed, always in an upward direction toward the body, with firm-grasping pressure and energy, using the bare hands, dry flannels, or handkerchiefs, and continuing the friction under the blankets or over the dry clothing. The warmth of the body can also be promoted by the application of hot flannels to the stomach and armpits, bottles or bladders of hot water, heated bricks, etc., to the limbs and soles of the feet.

Rule IV.—After treatment.—Externally: As soon as breathing is established let the patient be stripped of all wet clothing, wrapped

in blankets only, put to bed comfortably warm, but with a free circulation of fresh air, and left to perfect rest. **Internally:** Give aromatic spirits of ammonia in water in doses of a teaspoonful, or other stimulant at hand. **Later manifestations:** After reaction is fully established there is great danger of congestion of the lungs, and if perfect rest is not maintained for at least forty-eight hours, it sometimes occurs that the patient is seized with great difficulty of breathing, and death is liable to follow unless immediate relief is afforded. In such cases apply a large mustard plaster over the breast. If the patient gasps for breath before the mustard takes effect, assist the breathing by carefully repeating the artificial respiration.

Modification of Rule III (to be used after Rules I and II in case no assistance is at hand).—To produce respiration.—If no assist-

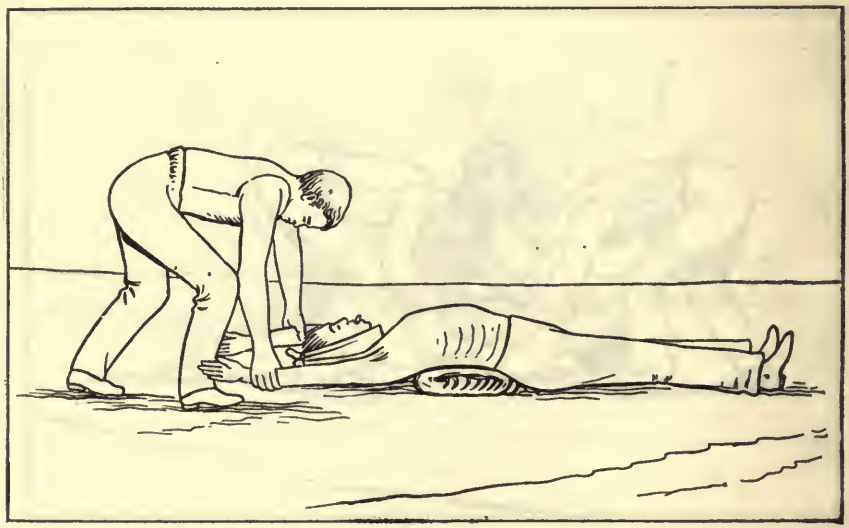

FIG. 24.

ance is at hand and one person must work alone, place the patient on his back with the shoulders slightly raised on a folded article of clothing; draw forward the tongue and keep it projecting just beyond the lips. If the lower jaw be lifted, the teeth may be made to hold the tongue in place; it may be necessary to retain the tongue by passing a handkerchief under the chin and tying it over the head.

Grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting. (Fig. 24.)

Next lower the arms to the sides and press firmly downward and inward on the sides and front of the chest over the lower ribs, drawing toward the patient's head. (See fig. 25.)

Repeat these movements twelve to fifteen times every minute, etc.

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water; and if you do, you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden

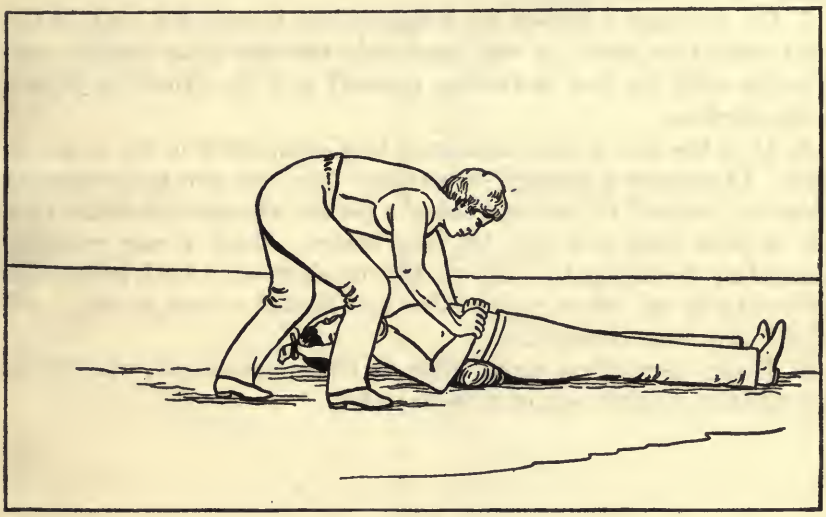

FIG. 25.

pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, having hold of his hair, you on your back and he also on his, and, of course, his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons; the writer has even, as an experiment, done it with four, and gone with them 40 or 50 yards in the sea. One great advantage of this method is that it enables you to keep your head up and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this man-

ner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a **death grasp**; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tide way or stream which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom the hair of the head should be seized by one hand only and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong " outsetting " tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide and sinks in the effort, when if he had floated a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

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